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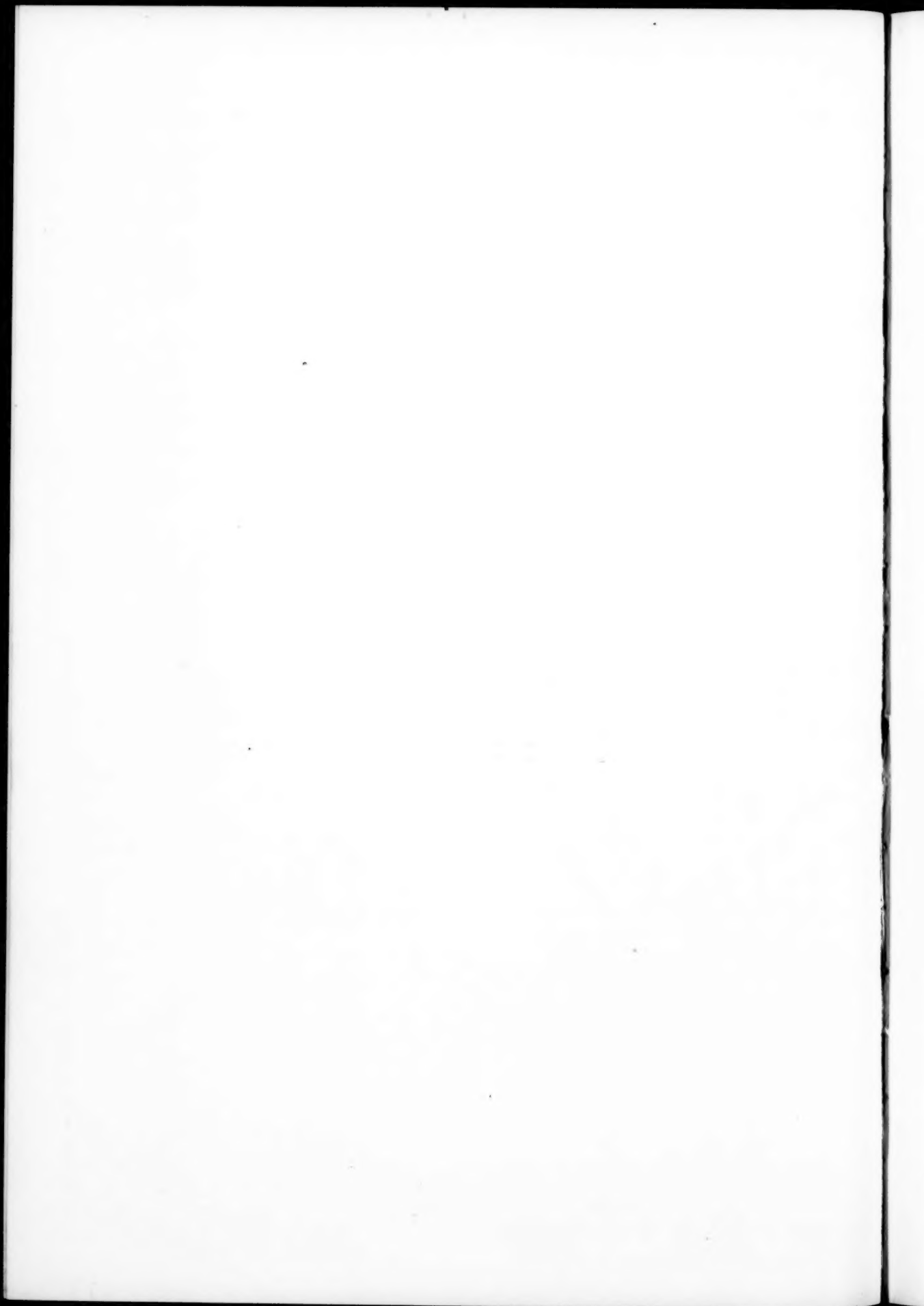
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ARCHIVES OF PHYSICAL THERAPY, X-RAY RADIUM

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NEWER PHYSICAL AIDS IN THE DIAGNOSIS AND TREATMENT OF PARTIAL DEAFNESS*

A. R. HOLLENDER, M. D.

Professor of Otolaryngology, Chicago Eye, Ear, Nose and Throat College;
Attending Otolaryngologist, Lutheran Memorial and Illinois Masonic Hospitals.

AND

M. H. COTTLE, M. D.

Attending Otolaryngologist, Lutheran Memorial and American Hospitals,
and the Chicago Eye, Ear, Nose and Throat Hospital.
CHICAGO, ILL.

Diagnostic and therapeutic methods in otology have shown a marked advance during the past few years, first, by the invention of the audiometer, an accurate and scientific means of examining cochlear function, and second, by the results obtained with physical agents in partial deafness, principally of the chronic catarrhal type.

The development of mechanical and physical aids for aural diseases marks a stage in progress such as has been noted in other specialties and for which similar aids have been largely responsible. The developing relations of the physical to the medical sciences was recently discussed at length by Crile, who remarked in part, "During the past century the fields of physics and chemistry have been extending with phenomenally rapid strides, and this progress, together with the ever increasing specialization within the field of medicine, has caused workers within this field to realize that they must look

In suggesting a new method of treatment for partial deafness, which has for its basis physical measures, it is necessary to present convincing increasingly to the sciences of chemistry and physics for the interpretation of vital forces and for aid in the extension of therapeutic measures." proof of its value. This we have endeavored to do by submitting a report of our laboratory and clinical investigations. Persistent and fair trials under proper conditions and on selected cases have demonstrated the merits of diathermy, galvanism and ultra violet light. The actions of these therapeutic agents have been greatly enhanced by improved electrodes, apparatus and technic.

EXPERIMENTAL STUDIES

In April and May (1926) issues of the *Archives of Otolaryngology*, we gave in detail the results of our laboratory studies. Experiments were performed on living dogs properly anaesthetized. The following deductions were made:

1. Diathermy introduced by way of the ear

*Read at Sixth Annual Meeting, American College Physical Therapy, Chicago, Nov. 3, 1927.

canals does not reach the middle and inner ears with adequate intensity.

2. Diathermy introduced by an active electrode behind the external ear, with the indifferent electrode anterior to the ear on the opposite side, produces a substantial rise in temperature in the region of the ear from the middle ear to the inner surface of the skull.

3. With diathermy, the maximum temperature is reached only after ten minutes application.

4. With d'Arsonval currents of 300 to 500 milliamperes, there is practically no effect on the brain nor on the body temperature.

5. The highest temperature obtained was between the muscle and bone, where the increase was usually greatest.

6. In living tissue there is a return to normal temperature within twenty minutes; in dead tissue the change is much more gradual (up to two hours.)

7. Under identical conditions, a d'Arsonval current produces higher temperatures in dead than in living tissues.

CLINICAL INVESTIGATIONS

The foregoing deductions are significant because they have definite clinical application. They explain at once that diathermy to prove effective must not be administered by way of the ear canals. The reasons should be obvious.



Fig. 1. Active electrode over mastoid area of affected ear.

If intracellular heat is of any value in influencing the pathological state existing in an old catarrhal deafness, it must be delivered by the shortest and most direct route. Intervening hindering factors must be avoided. When diathermy is applied by way of the ear canals a large part of the heat is lost before it reaches the middle ear. As direct contact with the tympanum is not practical, the intervening air space and the tympanum itself must conduct the heat and this cannot be done adequately. Nor does the heat by this route reach the anatomical structures involved in pathology.

Furthermore, there have not been available until recently suitable electrodes or apparatus for properly applying diathermy through the ear canals. The index fingers had to be employed, after cuffing the hands—a plan which has been the chief cause of failures with diathermic therapy for aural conditions.

On the basis of the experimental work done, diathermy is properly administered when the active electrode is placed behind the external ear—mastoid area, Fig. 1) with the indifferent electrode anterior to the ear on the opposite side (Fig. 2.) Diathermy by this method produces the desired heat generation at the site of the petrous portion of the temporal bone.

TECHNIC AND APPARATUS

The electrodes are held in place by a head band with suitable binding posts for insertion of the electrode rods. The apparatus is very



Fig. 2. Indifferent electrode in position.

flexible, fitting any head and permitting the placing of electrode not only for the treatment of ear conditions, but also at any site on the head or face. (This arrangement is likewise well adapted for the treatment of sinuses or for nerve affections.) Other points to be noted are the milliamperage, duration and frequency of applications and the "follow-up" therapy.

It is seldom that more than 400 milliamperes are necessary. Usually 250 or 300 milliamperes suffice. The time for a single treatment is about twenty minutes, after which negative galvanism is given for five minutes. The latter is administered through the same electrodes, simply by changing over the cords from the high frequency machine to a galvanic apparatus. The cord leading from the negative pole is attached to the active electrode. The number of treatments necessarily varies and can be determined only by the requirements of the individual case and the progress made. Three applications weekly, on alternate days, should be adhered to, for, in our experience, a lesser number is usually unproductive of favorable results. Improvement, when it occurs, is noted after three or four weeks.

THE AUDIOMETER

The hearing should be tested by tuning forks, whispered and conversational voice tests

and by the audiometer (Fig. 3). These tests are reasonably adequate for checking-up purposes. Retests are made every three weeks with the aid of the audiometer which is very well adapted to this work. It permits the making of charted curves which are valuable for comparisons. Improvements are often noted in this manner some time before the patients are able to detect them in their daily routine. By means of the audiometer, also, cases can be properly selected for treatment (Figs. 4, 5 and 6) because the charted curves have diagnostic significance and either confirm or oppose the diagnosis arrived at by the older hearing tests. In our work the 2-A audiometer has been used. This instrument has been devised for general practice, and for this reason, according to Fletcher, great stress has been placed on the convenience and simplicity of its operation. "Eight tones spaced an octave apart in the frequency range from 64 to 8192 vibrations per second can be produced by throwing the appropriate keys in the keyboard of the audiometer. The attenuator scale is calibrated so that the hearing loss in sensation units is read directly from the scale when the dial is turned to the position corresponding to the threshold for the patient being tested." The audiometers are standard. Audiograms taken by two otologists using different instruments should show practically the same curve. The variation, if there is one, will not be more than five sensation units. Such uniformity of

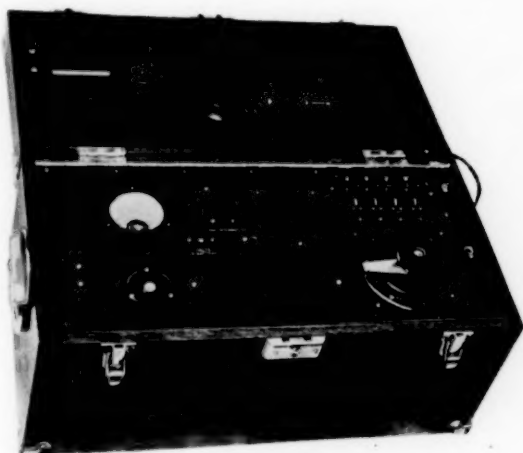


Fig. 3. 2-A Audiometer (Graybar.)

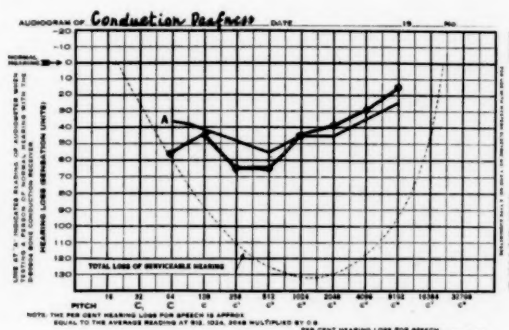


Fig. 4. Audiogram—Typical case of Chronic Conduction Deafness.

findings necessarily leads to similar diagnosis.
 PATHOLOGIC CHANGES IN CHRONIC CATARRHAL
 OTITIS MEDIA, OTOSCLEROSIS AND
 NERVE DEAFNESS

Acquired partial deafness is due to either intrinsic or extrinsic disease along the auditory tract, or to traumatism. It involves the sound-conducting apparatus, the labyrinth, the acoustic nucleus or the acoustic centres. (Phillips.)

As Politzer showed long ago the pathologic changes in the *chronic catarrhal type of otitis media* may involve the whole mucous membrane of the middle ear or only circumscribed areas. There is usually a greater or lesser amount of fibrous connective tissue formation which may remain, or lead to fixation of the ossicles by its contraction, calcification, or ossification.

In *otosclerosis*, the pathological changes as noted by authorities differ somewhat. Politzer believes that there is, primarily, disease of the bony labyrinthine capsule. The changes as noted by him are: osseous new formations, atrophy of Corti's organ, atrophy of the acoustic nerve in the cochlea and of the ganglionic layer in the spiral ganglion, and atrophy of the origin of the acoustic nerve.

Phillips, as well as other writers, are of the opinion that the lesion is a spongification of the bone of the labyrinthine capsule. "The process begins as a change from the normal consistency of the bone to that of compact bone. The

spongification takes place particularly in the labyrinthine capsule and around the oval window, eventuating in an involvement of the annular ligament, and finally in an ankylosis of the foot plate of the stapes."

The relationship of certain organic diseases, particularly syphilis, to otosclerosis has long been entertained, but only occasionally is syphilis shown to be of definite etiologic significance. More recently some reports on the calcium deficiency in otosclerosis have been of interest. The investigations of Leicher, and Kopetsky and Almour have cast some light on this subject. These latter findings indicate that the constitutional factor is of etiologic importance and must be duly considered when undertaking treatment.

Nerve deafness originates from causes which commonly produce neuritic changes in other parts of the body. The cause may be similar to those in otosclerosis. All types of nerve disorders from the simplest form of neuritis to complete degeneration of the nerve are known to occur. In acoustic neuritis, according to Wittmack, the disease is confined almost exclusively to the nervous cochlearis. As long as the ganglion cells are not destroyed completely, regeneration of the nerve is believed possible. (Phillips.)

Toxic factors are commonly thought to play an important part in this type of deafness. The indications for treatment must be based not only on the pathologic state, but also on the underlying etiology if the same can be ascertained.

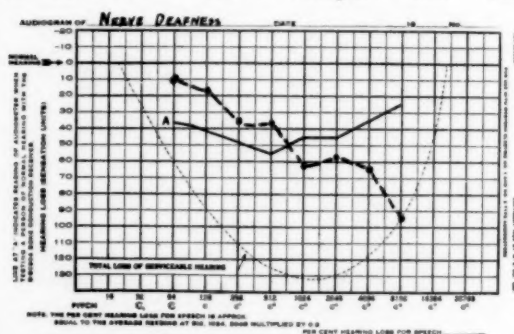


Fig. 5. Audiogram—Typical case of Nerve Deafness.

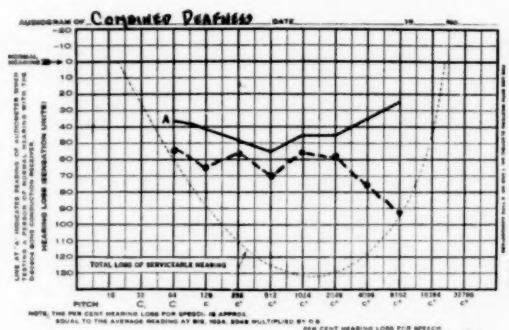


Fig. 6. Audiogram—Combined Deafness.

ACTION OF PHYSICAL AGENTS ON PATHOLOGY
IN PARTIAL DEAFNESS

Diathermy, as its name implies, is capable of heating through tissues. It is converse in nature and is created within the tissue structures. It is, therefore, endogenous. Converse heat within a part is the most potent factor in production of hyperemia and this results after diathermy administration.

The penetration and degree of heat from diathermy are always under control, but chemical activity is increased in direct relation to increase in temperature. Structural changes in the mucous membrane of the middle ear, or fixation of the ossicles are influenced by diathermy. Absorption of calcified deposits is effected to such a degree that function may be partially or completely restored. By its action on the immediate circulation, its ability to produce hyperemia, intercellular tension is altered and cellular activity stimulated. Exudates and fibrous tissues are disintegrated and muscle spasm relaxed.

For otosclerosis, besides local diathermy, general body irradiations with the air cooled mercury vapor quartz lamp should be tried. This measure augments the calcium content of the blood and alters general body metabolism. Results in this type of defective hearing are of course extremely doubtful.

Incipient nerve deafness may sometimes improve with local and general measures. When it

is possible to remove the etiologic factors, the action of diathermy, synergised with negative galvanism is indicated. Ultra violet irradiations are effective in cases of lowered resistance. The uses of these agents here must be considered purely empiric. If more or less destruction of the nerve exists, the results will naturally be proportionately poor.

The adjuvant action of negative galvanism as a follow-up in the local treatment must not be overlooked. The negative pole is capable of aiding in the softening and relaxing processes which are augmented considerably by a previous diathermy application.

It should be noted that cognizance is taken of the treatment, both conservative and radical, of any existing rhino-pharyngeal, dental and other pathological findings, particularly those of an infectious nature. Obviously there are definite causes for progressive deafness. Most of these originate as the result of repeated attacks of nasopharyngeal catarrh in childhood. By proper prophylaxis, many cases of deafness could in all probability be prevented.

ILLUSTRATIVE CASES OF CHRONIC
CATARRHAL DEAFNESS

Case 1—Mrs. W. K. McK. Age 32, housewife. Hard of hearing for five years or more. First noticed inability to hear well after attack of influenza. General health good. Nose and throat negative. Teeth negative. Wasserman negative. Has had several courses of inflation treatment without any change. Eustachian tubes patent. Otoscopic picture gives no evi-

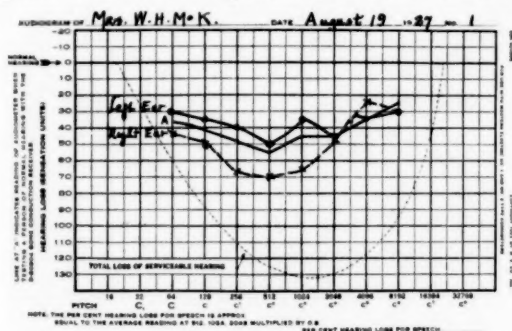


Fig. 7. Audiograms of Right and Left Ears, Case No. 1, at time of first examination.

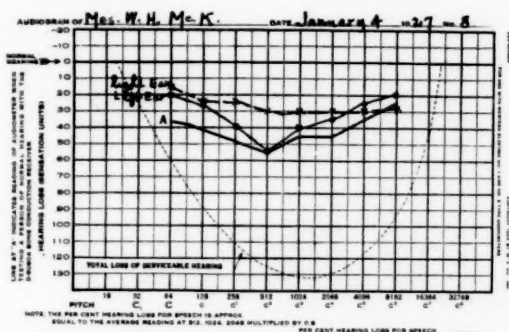


Fig. 7-A. Case No. 1, after treatment.

dence of pathologic change, with exception of slight retraction of both drums. Tuning forks and whispered voice tests speak for diagnosis of conduction deafness. Audiometer confirms this diagnosis. Fig. 7 shows audiogram at time of first examination; Fig. 7-A audiogram after 40 treatments, about 20 to each ear.

Case 2—W. H. Age 38, clerk. Hard of hearing for about 16 years. Suddenly found he was unable to hear at all on right ear. Marked tinnitus which becomes aggravated when contracting slight cold. Has had submucous operation, which however was incomplete and of no benefit to deafness. Has had various types of treatment to ears without success. Blood Wasserman negative. General health fair. Fig. 8 shows audiograms of right ear at time of first consultation, April 21, 1926, and at time of discharge, September 18, 1926. Three to four treatments were given weekly during this period.

Case 3—W. M. Age 22, printer. Difficulty in hearing for about eight years. Occasionally gets dizzy spells. Ears discharge slightly at times. Does not remember whether deafness followed any illness. Nasal septum markedly deviated to the right with much crowding. Otoscopic picture shows large perforations in both drums. Usual fork and labyrinthine tests performed. Fig. 9 shows audiograms of left ear made at time of first examination, May 12, 1926, and on July 21, 1926 when treatments on left ear were discontinued.

INFLUENCE OF PHYSICAL AGENTS ON TINNITUS AURIUM

Two types of tinnitus aurium are recognized, viz; subjective and objective. Only subjective tinnitus will be considered.

After determining the relationship of systemic and local causes and correcting them.

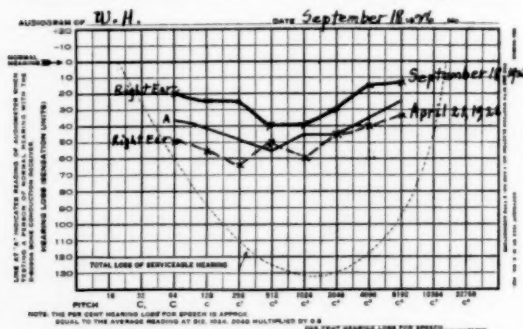


Fig. 8. Audiogram of Case No. 2, before and after treatment.

physical measures should be employed first, alone, or in combination with other remedies. Many patients have tinnitus associated with a deafness of catarrhal etiology of long standing, and in spite of the fact that the pathology is removed or corrected, the tinnitus persists.

When routine measures appear to be inadequate, deep heat should be applied to the auditory mechanism, employing the same technic as in partial deafness. In addition, posterior intranasal diathermy is sometimes of benefit, depending on the extent of involvement in the eustachian tube.

No claim can be made that diathermy is a specific for tinnitus, nor that it will cure any case. It is, however, a valuable aid in affording relief to many patients, the relief being of longer duration in some than in others. Diathermy alone, without supplementary remedial measures to meet such constitutional indications as may exist, is usually without value.

The tonic effects of ultra violet irradiations to the body occasionally produce indirectly a favorable influence on tinnitus when the underlying factor is metabolic in nature and not due primarily to local aural changes. This form of treatment should be advised as an adjuvant to local therapy, when the causes are obscure, or when empiric therapy is indicated for certain reasons.

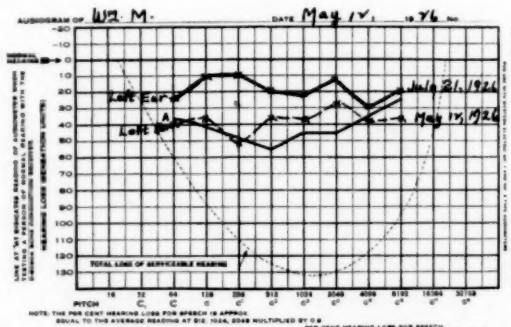


Fig. 9. Audiograms of Case No. 3, before and after treatment.

CONCLUSION

As Crile has stated, "it is inevitable that the future progress in biological sciences," irrespective of the particular field, "must be towards methods of physical investigation." Advances already made in otology, resulting from an attempt to investigate the potentialities of

physical aids in certain types of defective hearing, have demonstrated rather definitely that more extensive scientific research along these lines will eventually lead to a solution of the problem.

30 N. Michigan Ave.

TABLE (FOR COMPARATIVE PURPOSES) SHOWING RESULTS OBTAINED IN A SERIES OF CASES OF PARTIAL DEAFNESS.

	Total No. of cases	Nasal or Pharyngeal Pathology	Nose or throat operations performed	No. of cases previously treated by other methods	Average No. of treatments	No. of cases in which tinnitus was present	No. of cases tinnitus relieved	No. of cases in which hearing improved
Catarrhal Otitis Media (catarrhal deafness)	61	39	35	57	36 to 72	22	12	9* 12** 40***
Otosclerosis	29	6	2	25	54 or more	23	9	3* 1**
Nerve Deafness	17	13	5	13	54 or more	15	3	3* 2** 1***

* indicates approximately 25% improvement; ** 50%; *** 75%; **** 100%.

The improvement noted is based on the usual tests but principally on audiometer records. Ultra violet irradiations were given as a routine measure in all cases of

otosclerosis and nerve deafness, and in some cases of chronic catarrhal deafness.

Diathermy and Menstruation; Diathermic Treatment of Dysmenorrhea. Buden. Progress Medical, June 4th, 1927.

From his experience with 103 cases, Buden concludes that diathermy affects menstruation in such a way, that in a majority of the cases it renders the flow more abundant, more precocious and longer. It can even cause the reappearance of the periods if it is applied one or two days after their cessation. It is therefore contraindicated in women having a tendency to hemorrhage, as it is also contraindicated during the periods in acute affections of the adnexa. This treatment does not seem to be good in metritis, as it increases hemorrhage and aggravates the inflammation. One can, however, obtain good results in infectious metritis. Fibroma is also a contraindication.

Diathermy is useful in dysmenorrhea, particularly when there is a uterine hypoplasia. Fifty-two patients

were treated. In general there is a session three times a week, 20 to 30 minutes, 41 to 45 A. There are administered a series of 10 sessions, three to four series. The results have been 18 definite cures, 23 cures followed by relapses, 11, no results. Diathermy can have useful results in sterility combined with amenorrhea or oligorrhea.

On the Irradiation Treatment of Carcinoma; Foveau de Courmelles, Les Neoplasmes, 1927, 6, 5.

The author gives a chronological review of the methods of treatment of carcinoma with roentgen and radium rays. He indicates the great scientific advances made in this field and describes the many problems which await solution. He concludes his article with regret at the lack of knowledge in this field.

THE SO-CALLED IONIZATION TREATMENT OF CHRONIC SUPPURATIVE OTITIS MEDIA—ITS CLINICAL ASPECTS*

HAROLD L. WARWICK. M. D., F. A. C. S.
FORT WORTH, TEXAS

The so-called ionization method of treatment of chronic suppurative otitis media is not new, notwithstanding that a large majority of otologists are not acquainted with its theory, applications and benefits. As the literature contains so very little concerning these points, the otologist has had little to encourage him in the adoption of a procedure new to him, and little to guide him in the application of such a procedure to his particular problems in the treatment of chronic suppurative otitis media.

The so-called ionization method has been used in the treatment of suppurative otitis media since 1914, considerable literature appearing during a few years following, but as the idea was new at that time no extensive clinical experience was available for guidance in further use of the method. It is in only very recent years that the theory of the so-called ionization method has been carefully studied and applied to clinical observations.

In the first place the expression "zinc ionization treatment" is misleading. Zinc ions are the medicinal substance used in the treatment; it does not consist of an ionization of the otitis media or of bacteria, but rather is the resultant of the action of zinc ions previously formed on dissolving the salt in water and probably also of some of those zinc ions formed at the pure zinc electrode while the current is flowing, due to the joint action upon the zinc of electricity, sulphate ions and water. The zinc ions are put into bactericidal service by the technic of the method.

The use of zinc ions for the treatment of suppurative otitis media cannot be advocated for every phase and form of that disease. In order to facilitate discussion of the limitations of the method we will classify otorrhea into those cases which show (1) tympanic sepsis alone; (2) tympanic sepsis plus attic or mastoid sepsis; (3) tympanic sepsis plus inflammation of the external auditory canal or of the Eustachian tube, with or without septic teeth, tonsils or adenoids or sinus infection; (4) tympanic sepsis plus polypi, granulations or areas of caries; and (5) tympanic sepsis plus a combination of two or more of the foregoing conditions.

In cases of tympanic sepsis pure and simple treatment by means of zinc ions alone is sufficient in most cases, and especially so if the perforation in the drum is large enough to allow the introduction of a zinc sulphate solution and its distribution in sufficient amounts.

Cases coming under the third head must have additional treatment, such as the removal of diseased teeth, tonsils and adenoids to complete the cure and to prevent recurrence. Those cases in which polypi are present are amenable to such treatment after the polypi have been removed by cautery or by electrolysis or other methods. Cases in which there is attic or mastoid suppuration are nearly always unsuited for treatment by this method alone, because it is usually not possible for the fluid to gain access to the whole of the infected areas. The zinc ion method has been subjected to some criticism because of the alleged failure of the treatment to accomplish the cures claimed for it. A great many otologists have the idea that the method

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should cure any and all cases of suppurative otitis media, without any further consideration of other complications. Such is not the case; and a failure to realize this doubtless has been the factor in causing some otologists to voice the opinion that the method is without benefit. A number of otologists applying the method as herewith outlined to cases of simple uncomplicated suppurative chronic otitis media have reported an average of 92% of cures in such cases, and 80% of cures in applying the zinc ion treatment to complicated cases after the removal of the complications such as those before mentioned.

The technic of the method is relatively simple. The ear must be well cleansed and gently syringed with a warmed solution of zinc sulphate containing $4\frac{1}{2}$ grains of zinc sulphate to the ounce of distilled water. The patient is placed in a reclining position with the infected ear up. The auditory canal is filled with the zinc sulphate solution, a Seigel otoscope inserted and gentle aspiration done to remove any air bubbles which may be in the ear canal and tympanic cavity.

The positive electrode is a short piece of pure zinc wire which is passed through a bit of glass tubing provided with a rubber tip to make a tight fit in the external auditory meatus. This glass tube is also filled with the warmed zinc sulphate solution and placed into the meatus which has been previously filled with the solution. (If the perforation in the drum membrane is not large enough, one may use an attic canula and inject the solution into the middle ear or may enlarge the opening.) The negative pole is connected with a suitable sponge electrode which has been moistened with a sodium chloride solution and the sponge is held in the hand of the side opposite that being treated. A direct current of three milliamperes is slowly turned in and allowed to continue for ten or fifteen minutes and then gradually turned off. The external canal is not dried. Greatest care must be taken

to turn on the current very slowly, as otherwise the patient experiences some disagreeable reactions to even so small a current; and it should be turned off just as slowly. One must take care that the electrode does not come into contact with the walls of the external auditory canal else a burn may be produced.

* * * *

Just what happens in the middle ear during the passage of the current through the zinc sulphate solution has been a matter of some speculation for a number of years, and it was not until very recently that a thorough scientific consideration was given to the probable physico-chemical factors entering to the theory of the method. Stevenson, in a recent treatise, (*The So-called Ionization Treatment of Suppurative Otitis Media, Its Physico-Chemical Aspects*.) has so thoroughly covered this subject that I need to mention here only those clinical applications of which the otologist should be especially attentive.

It is necessary that one be provided with a direct electric current. A current that is both direct and finely interrupted such as that obtained from a motor-generator having about thirty or forty bars on its commutator is much to be preferred to that obtained from either storage or dry batteries, and the generator should be capable of delivering at least ten milliamperes of current when connected with the patient. Such a current serves a two-fold purpose. It propels the zinc ions into the ear bringing them into contact with the infecting organisms, and it produces a slight anesthesia which must to a large extent prevent the pain and discomfort during the treatment. The reaction produced by this current is in huge contrast to the rigid contractions produced by the galvanic current as obtained from dry cells or storage batteries. Further disadvantages of the battery current are that it readily produces vertigo, the patient complains of dizziness and that it seems as if the world were whirling toward the cathode. There

is usually nystagmus and inclination of the head toward the side upon which the positive pole is placed. A severe burning sensation is frequently experienced when a current from dry cells or a storage battery is employed. The direct current as obtained from a motor generator does not produce such reaction to an appreciable extent. An alternating current such as obtained from a commercial lighting circuit may not be used for this treatment under any circumstances. The use of this current has caused several otologists to proclaim that the method is of no benefit as well as being dangerous to the patient. This example shows the need of many otologists to inform themselves of the scientific principles underlying this method, and without which entirely satisfactory results cannot be obtained or expected.

Care must be taken that the proper wires from the generator are placed on their proper connections; the positive wire onto the zinc electrode to be placed in the ear, the negative wire to the sponge to be held in the hand. Should the wires be interchanged untoward results would be obtained. There would be no bacteriostatic action of the zinc ions. The negative current in the ear would act as a vasodilator, increasing discharge softening tissue and possibly inducing hemorrhage. On the other hand the physical effect of the positive current which should properly be connected to the electrode in the ear is that of a sedative and vasoconstrictor; it stops hemorrhage, reduces discharge and hardens tissue.

Some of the earlier workers advocated the use of glycerine as a constituent of the solution to be employed. It has been found in theory and in practice that such a solution is much less efficient than one consisting of only pure zinc sulphate dissolved in distilled water. I

employ a solution containing $4\frac{1}{2}$ grains of the salt to the ounce of water.

In my experience of treatment by so-called zinc ionization of several hundred cases of suppurative otitis media ranging in duration from a few weeks up to sixty years, the best results have been obtained in cases which show uncomplicated tympanic sepsis, although complicated cases are usually readily amenable to treatment after correction of the complication. This is especially true in the use of the method following radical mastoidectomy.

A few cases of otitis media complicated by sinus infection were temporarily relieved by the treatment, as the patient declined to submit to surgical operation of the complications the ear will probably continue to suppurate. Those cases of otitis media following scarlet fever seem to be very resistant to treatment by zinc ions. I have encountered a number of such cases, some of which were treated at intervals of ten days over a period of two years before the discharge ceased entirely. Some resistance to treatment has been noted in patients with pulmonary tuberculosis. Why these cases do not respond readily to treatment has not been satisfactorily explained.

I am convinced that the so-called ionization method is a valuable adjunct to our armamentarium for treatment of suppurative otitis media, and that it will find greater favour among progressive otologists when they have informed themselves of the principles underlying the theory and practical application of the method. Reports of results obtained with carefully selected cases which have been closely observed will do much to add to our knowledge of this long neglected method of treatment of suppurative otitis media.

SKIN AFFECTIONS OF THE EXTERNAL EAR*

LOUIS SAVITT, M. D.
CHICAGO, ILL.

The otologist who is usually consulted for relief or cure of auricular eczemas, furunculosis, dermatitis, erysipelas and other maladies involving the skin of the external ear must have at his command a knowledge of the causes, pathology and treatment of these conditions. Consultation with a dermatologist may be helpful, but the actual management so far as the patient is concerned is up to the ear specialist.

In reviewing this subject I shall deal with those affections of the skin of the external ear which are usually seen in routine office practice. I have grouped these under the following headings: (1) eczemas, (2) furunculosis, (3) dermatitis and (4) other affections of the external ear.

ECZEMAS

Eczema of the external ear may be either primary or secondary. The secondary form having reference to initial involvements elsewhere on the body. The *acute* eczema may extend beyond the auricle itself into the canal or it may cover the whole external ear. The causes are often chemical in nature, some medication having been employed on neighboring parts of the head and face. Eczema sometimes occurs after an acute suppurative otitis media. Undoubtedly in many instances systemic factors are at fault, so that the local etiology is often aggravated, when, for instance, scrofulous and rickety dyscrasias, remain uncorrected. Chronic eczema produces much the same symptoms as the acute, although the former is differentiated chiefly by the deeper tissue change in the cutis. The itching is the most constant symptom. When the disease is severe, extension into the canal may occur with swelling of the mucous membrane of the tym-

panic cavity and resultant tinnitus and disturbances of hearing. It is quite well known that these severe types are very obstinate and a poor prognosis is in order.

The treatment must include a careful study of the etiology, local and general, and causative factors must be removed or corrected so far as possible. The texts recommend lotions, ointments and dusting powders of all sorts, and while these sometimes are helpful, where the disease is not more or less self limited in its course, medical treatment frequently fails. It is in these cases that physical therapy offers great help to the otologist.

Radiant heat-light is quite efficacious in acute eczema. Daily exposures of twenty minutes duration will often abate the symptoms and produce permanent relief after five or six treatments. When possible, two irradiations daily are more satisfactory and often will relieve the condition more promptly.

Chronic eczema will be relieved of its intense itching by radiant heat light irradiations but the eruption itself requires more intensive treatment. Mild exposures of water-cooled ultra violet light at daily intervals, graduated from a two minute irradiation at first, and increased by one or two minutes daily, will, in the large majority of cases, give satisfactory results. The distance from the lamp to the external ear should not be over three or four inches. Variations from these suggestions will depend on the type of eczema being treated, its severity, and the duration and limitation of the disease. When well localized a good reaction may be necessary. This will therefore call for a close-up exposure of a sufficient time to produce the desired reaction.

*Read at Sixth Annual Meeting, American College Physical Therapy, Chicago, Nov. 3, 1927.

An interesting case in point is that of a young woman who suffered from a chronic left auricular eczema for fourteen years. Treatment of all sorts by otologists and dermatologists was a failure. The affection was local in character and extended, at times, into the auditory canal. Scaling, itching and burning were common and were relieved only for short intervals. Ultra violet irradiations with the water cooled quartz lamp, daily, and graduated as to time and distance as previously suggested, produced permanent relief in this patient, with no recurrence after two years. About twelve treatments in all were required.

FURUNCULOSIS

The many causes of furunculosis are too well known to repeat here. The systemic element must always be considered for frequently local measures are of little avail unless the underlying factors are corrected. Kerrison classifies the symptoms in the following order: (a) sensitiveness to slight manipulation; (b) pain; (c) tinnitus aureum; (d) impairment of hearing. Discharge, when present, occurs so late in the disease, and is so frequently absent, that it can hardly be regarded as a characteristic symptom.

One must be extremely careful of extensions of the disease as there are several avenues by which extensions may occur. A differential diagnosis sometimes is difficult and calls for much study on the part of the otologist.

In treatment, after the systemic phase has been attended to, local measures are in order. The latter are known to have proved a troublesome problem in otology. Of all the old remedies the warm fomentations of diluted lead subacetate solution still maintains itself as of good value, but its effectiveness may be enhanced by frequent irradiations of radiant heat-light to the affected part. As many as four to six twenty minute treatments are given daily and during the intervals, if the patient is not confined to

his home the moist compresses are applied. It is gratifying, indeed, to note the prompt relief which patients receive from these simple measures.

If the patient is ambulatory, and the furunculosis extends into the auditory canal, omit the compresses, and after a long irradiation in the office, pack the canal, loosely, with some narrow wicks of gauze which have first been saturated in a 1-500 neutral acriflavine solution. The treatment is repeated daily. Results in the milder cases are seen in a few days, in the more obstinate, a week or ten days will often be required.

DERMATITIS

Dermatitis of the auricle is occasionally met with particularly in industrial practice. The symptoms are at first of a mild inflammatory nature. Spreading of the infection over the entire auricle is noted in most cases. When an abrasion of the auricle fails to heal readily for some unknown reason, a secondary dermatitis is commonly observed, soon spreading to the auricle itself and sometimes to the back of the neck or face. The spreading is invariably due to lack of proper cleanliness.

Auricular dermatitis results also from suppurations from the middle ear itself or as a sequela to mastoidectomy or other operative procedures.

Simple as it may at first appear, ordinary remedies usually fail. The eruption spreads rapidly and this invites intensive treatment. When still of a mild nature, dermatitis of the auricle, face and neck, responds to daily treatments with radiant heat-light. When more severe, and failure of response with this measure is certain, quartz light irradiations are called for. The part must be cleansed thoroughly before the lamp is focused over the part. Long treatments are unnecessary as short exposures with the water cooled apparatus, at daily intervals, soon brings about a disappearance of the eruption. The average distance is eight inches. Duration of first

exposure is three minutes, increased two minutes each treatment. It is essential that uninvolvement of neighboring parts be protected from the rays of the lamp either by small towel or by cardboard in which a window has been cut the size of the affected area.

OTHER AFFECTIONS OF THE EXTERNAL EAR

The writer has not lost sight of the many other skin diseases which may involve the external ear. Herpes is occasionally seen. Erysipelas is more common than herpes and occurs either as a primary infection or extension from the head, face or neck. Erysipelas may present itself as a complication of otitis media or mastoiditis. Auricular perichondritis is described in most texts, and while not common, is occasionally seen. Lupus of the external ear must be mentioned. This lesion is especially noteworthy because of the specificity of ultra violet energy for its treatment. Syphilitic lesions of the auricle must be included in this list.

Malignant disease of the auricle, such as epithelioma is well managed by electrocoagulation. If the lesion has not extended by metastasis, surgical diathermy for destruction of the ulceration or growth offers a good prognosis.

CONCLUSIONS

Thus physical therapy is now available for more prompt relief of the commoner and rarer auricular skin affections. Radiant heat-light for the acute types and ultra violet energy for the chronic forms of skin diseases have given promising results and have replaced unsatisfactory and unreliable medicinal remedies. For alteration of systemic errors, general body irradiations with quartz light, supplementary to local treatment, is quite often of marked value. As already stated, malignant growths are well managed by surgical diathermy.

30 N. Michigan Ave.

Pneumo-radiography of the Kidney. Schilling, Rg.

Schilling describes Rosenstein's technic for pneumo-radiography of the kidneys as follows:

"The patient is placed in the kidney position. Just below the twelfth rib and at the outer edge of the lumbar muscles there is inserted an ordinary record-needle to the depth of four to six cm., according to the thickness of the covering in a direction posterior anteriorly, with a slight direction upwards and medially." The position of the twelfth rib may be determined by x rays. The point of the needle should be in the fat capsule. There should be no bleeding nor should the needle make too large respiratory excursions. In the latter case the point of the needle is probably in the kidney.

Oxygen is injected by means of a 100-cm. syringe with an easy running piston. Resistance should be trifling. From 400 to 600 c.c. of oxygen are injected, whereupon there appears a marked tympanism in the lumbar region, and there should be no pain.

After the injection the patient is placed in the sitting position in order that the gas may rise around the

upper end and the organs be photographed immediately afterward.

By turning the patient in front of the screen the kidney can be viewed from various sides. Its form, size and situation are distinctly visible. Pneumo-radiography entails little risks. Some few cases of temporary embolism have been reported.

Inflammatory renal conditions, pyonephrosis and tuberculosis constitute contra-indications as in these diseases there might be danger of perforation.

Cases in which this method may be employed to advantage include:

1. Renal tumors.
2. Where it is desired to ascertain the relation of the kidney to another tumor.
3. Kidney dystopia.
4. Stone appears more clearly than in an ordinary film or in pyelography.
5. Adhesions.
6. The suprarenal gland is often clearly shown.

Demonstrations of pneumo-radiograms in different conditions are given.—*International Clinics*, December, 1927.

PHYSICAL THERAPY IN DISEASES OF THE EAR*

F. L. WAHRER, M. D.
MARSHALLTOWN, IOWA

Probably no group of diseases are of more common interest to the medical profession than those of the ear. Not only are many of these cases first seen by the general practitioner but, by necessity, a certain percentage must be treated by him. Hence its successful treatment should be of paramount interest, not only to every otologist, but to every man doing general practice.

The first essential in the treatment of any disease is the correct diagnosis. In diseases of the ear, especially, an exact, differential diagnosis is absolutely essential. This includes not only a definite knowledge of the type of ear disease present, but also the causative factor, and the pathological changes which have taken place. It is practically useless to treat infections of the ear, unless the exciting factor can be first eliminated. In many instances, this means that existing pathology in the nose and throat must be corrected by surgery, before treatment is actually applied to the ear. Experience has taught us that practically all diseases of the middle ear are due to infections from tonsils, adenoids, or sinuses. These infections, with possibly a few exceptions, have their mode of entrance through the Eustachian tube. Infections by way of the external canal are possible only when there is a perforation of the ear drum.

Those diseases in which we are interested are divided into two general groups. (1) Diseases of the external canal, and (2) diseases of the middle ear and labyrinth.

The diseases of the external canal of more common occurrences are Furunculosis, impacted cerumen, and foreign bodies in the canal.

*Read at Sixth Annual Meeting, American College Physical Therapy, Chicago, Nov. 3, 1927.

1. Furunculosis, appears as a circumscribed inflammatory area at some point along the auditory canal. It may partially or completely occlude the lumen of the canal. There may be several points of inflammatory foci. The diagnosis is made by inspection. Treatment—if there is a definite localization of pus, the canal should be freely incised at this point, and the pus evacuated. The wound is then cleansed with 5% mercurochrome solution and a pack of equal parts of guaiacol and C. P. Benzoin applied to the canal. This is followed by infra red radiant heat for thirty minutes. In cases where there is no localization of pus, this treatment is carried out in the same way except that no incision is made. If the condition is seen early, the furunculosis in most instances can be aborted.

2. Impacted cerumen is not as a rule a serious condition, if properly handled. The cerumen should be removed by repeated irrigation, and without instrumentation. Most of these cases show some irritation of the drum, which should be cared for at the time. I prefer 25% silvol solution instilled into the ear, followed by radiant heat for twenty to thirty minutes.

3. Foreign bodies in the ear canal, each present their own individual problems for removal. The trauma in these cases is similar to that found in impacted cerumen and the resulting inflammatory reaction can be created in the same way.

Diseases of the middle ear and labyrinth present an entirely different problem from diseases of the external canal. Any disease of the middle ear immediately becomes a matter of major importance. Those diseases of the middle ear and labyrinth with which we are most vital-

ly concerned, are: otitis media, purulent, acute and chronic, otitis media chronic catarrhal, acute periostitis, and otosclerosis.

1. Every *acute purulent otitis media*, whether resulting from a simple coryza, or following scarlet fever or measles, should be regarded as a serious and dangerous condition. Every acute otorrhea should be considered as a potential mastoiditis. The difference is largely one of degree. Every case of Streptococcus infection should be placed in the hospital and even mild cases, confined to the house or to bed, if the temperature is at all elevated.

Treatment in these cases consist in (1) a few drops of hydrogen peroxide instilled in the ear; (2) irrigation with boric acid solution; (3) light suction; (4) 25% silvol or 10% argyrol in the ear and (5) radiant heat, applied for thirty minutes every two or three hours.

I feel that the two principal factors in this treatment are the suction and radiant heat. Quoting from an article by Dr. Otis Wolfe,¹ "Suction is the most efficient means of keeping the canal clear of pus. It also promotes hyperemia and stimulates phagocytosis. Drainage of the middle ear is also obtained by suction. This is easily demonstrated by thoroughly cleaning the ear by irrigation or mopping, and then applying suction. Pus will then be noted in the canal or exuding through the opening in the drum. It is only fair to presume that it drains the antrum as well. Phillip² and Kerrison³ both emphasize that the antrum is the posterior end of the tympanic vault. It therefore performs much the same function as the postauricular drainage operation of Phillips. It obtains drainage without breaking down nature's barriers or running the chance of infecting a new field in the mastoid. Early and free incision of the tympanic membrane is however, absolutely necessary."

Radiant heat plays a most important part in the treatment of acute purulent otitis media.

In treating these cases we not only seek to cure the patient, but to do it quickly, and with as little inconvenience as possible. Long drawn out cases are liable to become chronic in nature, with all the resulting complications and dangers. I feel that suction and radiant energy are the most efficient methods in quickly terminating this condition. Radiant heat, like suction, produces a mild hyperemia and leukocytosis. It is also a great aid in rendering medication more effective. The sedative action of radiant heat is well known, and the pain which is always present to some degree in these cases, is very quickly controlled. Children, crying with pain, are usually asleep in a few minutes after the heat is applied. The fourth point in the action of radiant heat is its marked germicidal effect.⁵

Under this treatment, most cases are discharged in from four to ten days. In a long series of cases running over a period of eight years, we have found it possible to almost eliminate the simple mastoid operation. Naturally, the pathology in the nose and throat must be taken care of on these cases. Practically all of these cases have either diseased tonsils, adenoids, a deflected septum, hypertrophied turbinates or a sinus infection. These conditions must be dealt with either by local treatment or surgery, or a combination of both. In extreme cases in children I recommend the early removal of adenoids and tonsils,⁴ as it aids greatly in the quick and successful treatment of the case.

Diathermy is not indicated in the treatment of acute purulent otitis media, as it is liable to cause an acute exacerbation of all symptoms.

2. *Chronic purulent otitis media*. The treatment in these cases may be either surgical or medical. I feel that in practically all of these cases, the patient should be given the opportunity for cure by medical treatment. Those cases in which there is a large central opening in the ear drum, give the best chances of a successful result.

I have used two general types of treatment in these cases, both of which depend largely on physical therapy. The first is simply a variation of the treatment used in the acute cases, with the addition of diathermy. The ear is carefully cleansed by irrigation and mopping. This is followed by suction, after which the ear is again carefully cleansed and dried. Any granulation tissue is controlled by the application of silver nitrate or chromic acid. The ear canal is then filled with either 5% mercurochrome, 25% silvol, 75% alcohol, or pure ether. I rotate the use of these solutions, seldom using any of them for more than ten days. I feel that any of these solutions have a tendency to lose their efficiency upon continuous use. Radiant heat is then used for 30 minutes and followed by diathermy for 20 minutes. The results obtained in these cases are largely due, I feel, to the drainage obtained by suction, and the dehydrating and germicidal action of the radiant heat and diathermy.

The other method is that of zinc ionization. I follow the technique in general use, which is a current of 3 to 4 M.A. for a period of ten minutes. This is repeated at five day intervals. Frankly, I am not able to report the excellent results given by many men in these cases. However, I have found it a most valuable aid used in conjunction with the other treatment of chronic purulent otitis media.

In these cases, just as in the acute cases, the importance of eliminating pathology in the nose and throat cannot be over-estimated. It is impossible to expect a cure in these cases without first removing diseased tonsils and adenoids, or correcting deflected septums and sinus infection, when present.

3. *Chronic catarrhal otitis media* is one of the most common conditions with which we have to deal. In most instances it is extremely amenable to treatment, and excellent results may be obtained. The disease in its later stages may be almost impossible to differentiate from oto-

sclerosis, but, as a rule, the diagnosis may be determined by a history of irregular progressive deafness with periodic attacks of tubal catarrh, accompanied by a sensation of fullness, pressure, and pain. The tympanic picture shows a loss or impairment of the light reflex, with thickening and retraction of the drum membrane. Hearing is increased after inflation. Labrynthine disease differs from chronic catarrhal otitis media in the characteristic symptoms of vertigo and deep seated tinnitus, and in the loss of the bone conduction of sound.

The first step in the treatment is to remove the exciting factor in the nose or throat. This is absolutely essential. The patient can now be placed on diathermy treatment, which in most cases gives results of such nature as to be almost startling in its effect. This effect is true not only in regard to the improvement in hearing, but to the relief of tinnitus, which to many patients is of equal importance with the restoration of hearing. The diathermy treatment in these cases is applied according to the technique of Hollender and Cottle.

4. *Acute periostitis* of the mastoid region is characterized by pain, redness and swelling over the mastoid area and it is at times difficult to differentiate between it and acute mastoiditis. The main differential points are that in periostitis the swelling is inclined to be higher and more posterior, the pain is not so intense on deep pressure, and there is a tendency toward localization of the inflammation.

These cases if seen fairly early, before there is a localization of pus, can be aborted by treatment. It is my practice to paint the involved area with equal parts of guaiacol and C. T. Benzoin, and apply radiant heat for a period of thirty minutes every two or three hours. Practically all of these cases make a quick and uneventful recovery under this treatment.

5. *Otosclerosis* occurs in about 7% of all ear cases, and is hereditary in certain families.

About 50% of the recorded cases have a definite family history. It is usually present in both ears and occurs more commonly in women. It is a disease of young adult life, characterized by a progressive loss of hearing accompanied by tinnitus. Pathologically it is a primary disease of the labyrinthine capsule, causing a spongification of the internal ear, with a resulting fixation of the footplate of the stapes.

I have not found diathermy to be of any assistance in these cases. In fact I feel it is contra-indicated. Success has been claimed in some instances by the use of tympanic massage. Others claim to have seen results from the administration of phosphorous and potassium iodide. Personally I have never found anything that was really satisfactory in the treatment of otosclerosis. I mention this disease principally because I feel diathermy is contra-indicated.

In summing up the use of physical therapy in diseases of the ear, I believe we can safely say that it has proved to be the most important contribution to the treatment of these cases, and that has been advanced in the past twenty-five years. In fact, diathermy, radiant heat and suction have practically revolutionized the treatment of chronic catarrhal otitis media, and acute and chronic purulent otitis media.

In presenting this subject I have attempted to bring out the following points:

1. The first step in the treatment of any disease is a careful differential diagnosis. This is especially true in diseases of the ear.
2. Middle ear disease is potentially dangerous and should be given serious consideration at all times.
3. Middle ear diseases are practically always secondary to infection in the nose or throat. Therefore the causative factor in these cases must be eliminated early in the treatment.
4. The fact that pus can be demonstrated in the middle ear, is not an indication for the

immediate exploration of the mastoid bone. No patient should be subjected to a dangerous operation until a reasonable attempt to cure by other means, has failed.

5. Physical therapy is not a substitute for all of the older, successful methods used in the treatment of ear diseases. It is simply another method, of unusual value and importance.

CASE REPORTS

Miss E. M., age 26—Gives history of gradually losing hearing in both ears for the past two years. The left ear has been getting rapidly worse the past two months. She gives a history of frequent colds and sore throat. Hearing is worse after each sore throat.

Examination. Shows both ear drums thickened and retracted. Several calcified areas in Shrapnel's membrane, left ear. Rinne test negative, each ear. Tuning forks—Rt. C 512 air 20; Bone 60; C 64 air 6; bone 34. Left ear C 512 air 16; bone 62; C 64 air 4; bone 36. Watch—Rt. 6'', Left 4''. After Politzer, Rt. 10'', Left 6''.

Examination of nose negative. Examination of throat shows tonsils badly diseased. Posterior pillars thick and inflamed. Considerable adenoid tissue around opening of each Eustachian tube.

Diagnosis. Otitis media, chronic catarrhal. Advised removal of tonsils and adenoids followed by diathermy. Tonsils and adenoids were removed August 1st, 1927. Started diathermy August 6, 1927, and treatments were continued at three day intervals. August 16, the hearing with watch was Rt. 16'', left 12''. August 28, Rt. 32'', left 24''. Sept 9, Rt. 42'', left 38''. Sept 15, Rt. 48'', left 46''. Normal hearing in this test watch is 45''. Patient dismissed at this time. Oct. 15 she returned for examination and showed a slight increase in hearing in each ear. The hearing was increased in the right ear from 12% to 100% and in the left from 8% to 100%.

Miss A. M., age 49—Gives history of many colds the past few years. Has frequent headaches. Ears feel stopped up most of the time. History of abscess in right ear, ten years ago. No hearing in right ear since then. Post nasal discharge present every morning.

Examination shows both ear drums thickened and retracted. Hearing, watch—right 0'', left 30''. Tuning forks right C 512 air 4; bone 60. Left air 40; bone 60. After Politzer, watch, right 0'', left 40''. Examination of nose shows septum thick and deflected

to right. Both middle turbinates large and bony, and in opposition with septum.

Examination of throat shows tonsils are large, with pus in the crypts. The posterior pillars are congested and thick.

Diagnosis. Otitis media chronic catarrhal. Advised tonsillectomy, submucous resection and diathermy.

Sept. 4, a submucous resection was done and one-half of each middle turbinate was removed. Sept. 10, the tonsils were removed. Diathermy treatment to the ears was started Sept. 16. Oct. 4, the hearing with watch was right 6'', left 48'', Oct. 17, right 24'', left 50''. Nov. 10, right 30'', left 50''. One month later there was no change in hearing and patient was dismissed. Her hearing was increased in right ear from 0 to 65% and in the left ear from 65% to 100%. Examination three years later showed no change in hearing.

Miss M. M., age 17—Both ears have been discharging since she was three years old. For the past five years, hearing has been much worse. She takes cold very easily. Tonsils removed three years ago. Examination shows each canal filled with foul smelling pus. About 75% of each ear drum has been destroyed. Hearing, watch—right 3'', left 1-2''. Tuning forks—right C 512 air 6; bone 62; left C 512 air 3; bone 60.

Examination of nose shows septum deflected to left, high up and posteriorly, with large spur low down on the right. Examination of throat shows tonsils removed, but each fossa of Rosenmueller contains some adenoid tissue.

Diagnosis. Otitis media chronic purulent. Advised submucous resection and removal of adenoid tissue, which was done Feb. 14. Feb. 21, started diathermy treatments every fourth day. On March 27 both ears were dry. Diathermy treatments were continued until May 15 at which time treatment was discontinued as the patient moved to another state. Examination showed hearing with watch, right 18'', left 8''. The hearing in the right ear was increased from 5% to 40% and in the left ear from 1% to 16%.

Miss G. G., age 21—Gives history of both ears discharging most of the time since childhood. The past two months the ears have been worse. The amount of pus has increased and the right ear has been painful. She has had a bad cold for the past six weeks.

Examination shows a small amount of thick pus in each ear canal. Very little odor. Both drums have moderate sized peripheral perforations. Hearing, watch—right 12'', left 15''. Tuning forks—right C 512 air

14; bone 45. Left air 15; bone 42. Right C 64 air 5; bone 28. Left air 5; bone 30. Examination of nose, septum thick and deflected to right, high and posteriorly. Both middle turbinates enlarged and in apposition to septum. Examination of throat shows tonsils contain large crypts filled with liquid pus.

Diagnosis. Acute exacerbation of otitis media chronic purulent. Advised submucous resection, tonsillectomy, and treatment. Feb. 16, 1924, performed submucous resection with removal of one-third of each middle turbinate, and curettage of right anterior ethmoid cells, which were necrotic. Feb. 28, removed tonsils. March 6, started diathermy treatments every fourth day. Suction, 25 per cent silvol, and radiant heat used every second day. April 1, both ears were dry. Hearing, watch—right 32'', left 30''. May 5, examination showed hearing right 50'', left 50''. Both ears dry. Perforations very small. Patient dismissed. Examination two years later showed no change in condition.

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DISCUSSION

DR. S. T. RUBLEY (Monroe, Mich.): I think five minutes' time in which to discuss such a wealth of material is entirely inadequate. There are a few things I will merely mention. I want to thank the committee for presenting such a fine symposium as we have had here this morning.

I agree with Dr. Wahrer that the mastoid operation can often be averted by early incision of the drum membrane followed by physical therapy. Diathermy may be employed in children by means of the fingers in the ear through the indirect method of auto-con-

densation, and in adults by means of electrodes which fit the individual canal. I never hesitate to use diathermy in cases that are just showing an early otitis. I use it without any fear even before I do a paracentesis. If there is bulging, I do a paracentesis promptly and follow with diathermy. One or two treatments are sufficient to afford the patient relief.

In catarrhal otitis media, I use the treatment with the electrodes right at the angle of the jaw and as high up under the pinna of the ear as they can be placed. That catches the eustachian tubes where much of the pathology is in catarrhal otitis media.

I will agree with all the speakers in saying that there is very little help to be received from diathermy in cases of otosclerosis. Uniformly the results have been very discouraging. I think the greatest amount of benefit in the treatment of otosclerosis lies in a more extensive study of the condition. We know the pathology and we know the prognosis, but we know very little about the etiology.

I think Dr. Cottle has the right idea. He has an open mind, and he is not afraid to say he does not know. I think that negative results in this new field of physical therapy are just as important as positive results, and by the correlation of both of these by different observers it will eventually lead us to some definite conclusions on the treatment of ear conditions.

DR. ELLIS G. LINN (Des Moines, Iowa): Mr. Chairman and Fellow Practitioners: I was unfortunate in not being able to hear the first of Dr. Wahrer's paper. I am, however, familiar with its contents because of having read it some days ago. The Doctor was kind enough to send me a copy. I will mention only a few things.

He mentioned in the treatment of suppurative middle ear processes he sometimes used mercurochrome or silvol, or other local applications, after having cleansed the ear and followed the usual procedures in that regard.

I have thought I had obtained advantages by using first the mercurochrome for four or five successive treatments, then followed that with a 10 per cent argyrol, which in my experience has proven to be more satisfactory than the neosilvol or some of the other silver salts. However, someone may have had an experience quite to the contrary.

The cleansing of the ear by the suction process, of course, is desirable. I make it a practice, after using suction, to follow it up with catheterization, always inclining the head towards the ear I am treating.

For the removal of granulation tissues, I employ chloracetic acid rather than the chromic. I thought it was somewhat helpful. The subject of tinnitus was suggested. I know my experience is contrary to that of Drs. Hollender and Cottle. In our cases the tinnitus was frequently relieved, or at least improved, as was the faulty hearing.

I am glad to have heard Dr. Cottle's statements regarding otosclerosis, because I have come to the conclusion that otosclerosis is very little, if ever, influenced by remedial measures of whatever kind.

In zinc ionization, not only must the current be raised slowly, but the current must recede from its maximum just as slowly, or there will result a discomfort to the patient, about which he will complain quite considerably.

DR. FRANK J. NOVAK (Chicago, Ill.): One cannot find very much to quarrel with in the papers that have been submitted this morning.

I wish to comment on Dr. Wahrer's paper only on two points: The first is about the necessity of diagnosis before attempting any kind of treatment, particularly physical therapy. Otological diagnosis presupposes knowledge of otology. It is essential to make accurate and careful diagnosis before attempting any of these treatments. It is so self-evident it should seem unnecessary to make a point of it. The other point is the use of irrigation in acute otitis media. The doctor said he used suction and irrigation. I don't believe the irrigation is indicated. I do not believe it is good practice. Whatever you can accomplish by irrigation you can accomplish by suction, not necessarily by putting a large tip into the canal, but using a soft point and putting it into the ear and removing whatever secretions are present, I believe that is better than irrigation.

I was interested in Dr. Warwick's paper on zinc ionization. I must confess, while I have tried it on many occasions, I never had good results. Perhaps the reason is that the cases were those which the doctor pointed out as contra-indications. According to opinions the procedure is indicated in the simple tympanic supuration. Those of a chronic nature often clear up without anything. Those cases which do not clear up undoubtedly do well under zinc ionization. My experience has been with the cases that resisted all orthodox methods, and in which we had definite evidence the pathology involved not only the tympanic cavity but the epitympanic, the mastoid antrum and perhaps the mastoid. Most infections do not involve only the tympanic cavity, because from the anatomic structure

of the thing it is self-evident. There is the middle ear, and the antrum is simply a continuation of it, and with the intimate connection between the antrum, with the exception of the large type, it is evident it extends into the other tissues.

I was intensely interested in the paper of Drs. Hollender and Cottle, not only in the experiments in regard to penetration of heat and so on, but in the audiograms which they showed. There is only one thing I wish to discuss further, and that is the suggestion that perhaps some cases of nerve deafness are amenable to treatment. They pointed out there is a possibility, and it seems plausible there should be such a possibility, where the pathology is of such a nature that the nerve itself is not completely destroyed. Something may be done to influence that nerve. That supposition sounds all right, especially when you draw the analogy, as they did, with the facial nerve. We know the facial canal is almost completely filled by the facial nerve, but not completely. There is possibility of swelling in there without great damage to that large seventh nerve. Does that same thing hold in the eighth nerve? The eighth nerve come out of the internal auditory meatus.

We divide it into four quadrants. The eighth nerve comes out at the antero-inferior quadrant. The facial comes out of one large opening; there is room for swelling. A perineuritis in that area may be relatively extensive without any compression or mechanical trauma to that nerve. But the eighth nerve does not come out as a bundle, it comes out through minute perforations of this cribiform quadrant. The perforations are so small you need a magnifying glass to see them. The dura is invaginated here, and any inflammatory process that involves this portion, any of the soft tissue, will necessarily damage these extremely fine filaments which are coming through perforations, through that bone where the filaments are absolutely tight and fit exactly into these perforations. So that a perineuritis of the nerve is a perineuritis which destroys these filaments—not necessarily immediately, but it is an inevitable process. I do not believe you can draw the analogy between the eighth and the seventh.

DR. CARL B. SPUTH (Indianapolis, Ind.): I am just a novice in this work of physical therapy in eye, ear, nose and throat work, but I would like to give you my experience with some of the cases of catarrhal otitis media which I treated before I put in my equipment, and the results I got following the physiotherapy measures. I just want to discuss those cases in which the pathology, such as deflected septum and congested turbinates and probable involvement of the ethmoid, tonsils and adenoids were corrected. With our old

measures, inflations and so on, we got practically no results at all.

In some of the cases I have, the pathology was corrected by other good men of Indianapolis and other cities four or five years ago. Still there is definite persistence. With diathermy and negative galvanism, following the Hollender-Cottle method, I must say we got definite results. The increase in hearing ranged all the way from 25 to 50 per cent.

DR. HAROLD L. WARWICK (Fort Worth, Texas): I thought I was a good otologist until I bought an audiometer. People would say they could hear so much better, and when we made an audiogram we found it was not so.

In my paper in Otolaryngology I asked, "Is it an endocrine factor?" It was answered by Dr. David Drury that it is an endocrine factor. The money that is being spent by the American Otological Society, I think, is going to result in a great deal of good. They have large funds for the study of it.

Dr. Jeffery Divine of London, a friend of mine, who has otosclerosis, has recently given £80,000 as a beginning of a fund for the same study. Professor Berger of Amsterdam, Holland, thought so much of it as endocrine, he has interrupted pregnancy in two cases and found it endocrine.

As far as zinc ionization is concerned, I would like to say I mentioned turning the current off slowly. When you turn the current on there is an apparent rotation to the patient toward the cathode. When you turn it away the rotation is increased. It must be done slowly.

Speaking about these cases of simple tympanic sepsis, Judge Wagstaff, a very prominent gentleman of Abilene, Texas, waited for sixty years with a simple otitis, and I think two treatments of zinc ionization cleared it, and it has been clear ever since. I do not think we should wait too long.

DR. F. L. WAHREER (Marshalltown, Iowa): There seems to be a little question in regard to the results obtained in chronic catarrhal otitis media. I will admit that when you try to measure the exact difference in improvement between the removal of your exciting pathological factors and that obtained by the addition of your diathermy, it is rather an intangible factor. It is a little bit hard to say: it is this much or that much. However, I was practicing otology for some time before I started to use diathermy. I felt this way, in a general measure, that when my cases showed a hearing below 40 to 50 per cent, I could not promise

very much, with any degree of security, that they would regain what you might call practically normal hearing.

Since adding the use of diathermy I have come to the conclusion that my patients with hearing around 20 to 25 per cent can be promised, in most instances, that their hearing will be restored to approximately normal. I feel that I have made a gain of from 20 to 25 per cent with the addition of my diathermy.

There isn't any question, as I stressed in my first remarks, that diathermy is not going to do all the work. I feel it is simply an aid. However, I do feel it is worth while and that you will get results that you cannot obtain by your surgical measures alone; at least that has been my experience for the last several years.

It would be nice, theoretically, if we could turn some of our patients loose for from six months to a year after our surgery and have them come back, and then see what results were obtained. Unfortunately, patients are peculiar animals, and they will not always come back after that period of time and let you try them out. There is a psychological or financial element involved. But my case records before I used diathermy and since then have proven definitely to me the benefit of the use of diathermy, and I feel that I can account for an improvement of perhaps 20 to 25 per cent.

I wish again, however, to stress the removal of the exciting pathological factors. Anybody who starts to use diathermy without doing that is going to be greatly disappointed.

I cannot agree with Dr. Linn that these cases will show the same results from your surgical removal of exciting factors alone as they will with the addition of diathermy. I am afraid Dr. Linn has been a little unfortunate in his diathermy work, for some reason or other, because I very emphatically will state that you do get an increase.

Dr. Novak spoke about the use of irrigation. He is probably right. Irrigation probably is necessary, but in many of these cases irrigation is not necessary. You may say, "Why the peroxide?" I have had people object to that; perhaps that is also unnecessary. However, I have seen no harm from it.

In speaking of suction, it is my preference to use capillary suction. I generally take a eustachian catheter and bend it out. You can use a small glass tip, if you wish, and apply it to the parts of the canal which contain pus, and apply it to the opening in the ear drum,

and get your suction in that way. I really believe that is the better way of applying suction. In hospital practice where this is left to the nurse capillary suction cannot be resorted to.

DR. RAY K. DALY (Houston, Texas): I feel rather shy, this being my first meeting, about getting up and starting an argument, but after hearing Dr. Wahrer say Dr. Novak was right in his contention regarding irrigation, I feel it would be hardly fair on my part if I did not.

I shall begin by saying that both he and Dr. Novak are wrong in having suction in the ear. I think it is physiologically inaccurate. You drain it from the ear into the eustachian tube. When you suck, you are going the wrong way. You are simply drawing up the mucous and pulling it to the middle ear. What is the advantage? If you can encourage drainage into the eustachian tube, and if you have a large enough opening into the middle ear, you do not need any suction, it will drain by itself.

You know that acute otitis media is rather painful and irritable, and when you wipe and suck it, there is always some definite fighting in a child. You are irritating the ear. If you use irrigation, always gentle of course, always warm, it is very pleasant. The patient likes it. After three or four minutes of washing the ear with sterile saline, warm boric acid, whatever you like, you have an excellent view of the ear. You have not wiped it out; you have not irritated the patient at all. That is one thing.

In speaking of zinc ionization, we have used it for four years. I am sorry Dr. Novak did not get any results at all. In speaking to otologists I would say the diagnosis is the essential thing. I do not think anybody who is not an otologist should handle an ear of any kind. We do not hesitate to do radical mastoid operation if our diagnosis indicates it. I can see no advantage in irrigating or in zinc ionization when you have cholesteatoma. I think it is wrong to wait until you have immediate symptoms, when there is a brain involvement. Do a radical mastoid and you can wait as long as you like.

If you have a middle central perforation in the ear, which usually means otitis media, probably complicated, zinc ionization will help. I cannot say that you will accomplish the same thing without zinc ionization. If you have a series of cases of almost identical pathology you are going to get the same results with zinc ionization very much faster. We have demonstrated that with a case which will ordinarily run for several weeks, we can dry it up in two or three treatments, four or five days apart.

After a radical mastoid operation, with zinc ionization you can dry it up in two weeks and destroy the mastoid. Of course they often get well without that.

DR. M. H. COTTLE (Chicago, Ill.): On the subject of zinc ionization, I wish to confirm the statements made by Dr. Daily. I will, however, make one additional contribution to the method of application. I found that in some cases it is much more advisable to pack the wound with gauze, saturated in zinc solution, and attach it directly to the terminal rather than using the solution free in the cavity. I do not make any pretense at trying to explain that. I just find it is of advantage. In some instances it has proven efficacious.

We had such a case that had been operated by two of the very best men in the city of Chicago about fifteen years ago. The ear persisted to discharge. By the method described we have been able to limit the

otorrhea so that there is only occasional pus from the middle ear. This patient had also an ear that was about an inch thick, a chronic dermatitis with eczema, showing scaling on the surface.

This ear was treated with ultra violet light and after about six months we obtained a soft, pliable ear. Before that, if you tried the ear, it would have cracked. It was stiff, and it became soft by local ultra violet.

I think the subject of ionization needs one more comment (The dissension of opinion is due to the fact that all literature, beginning perhaps with Freil and other European observers, shows that they expect results after the first or second treatment. I used to say the same thing. "If you cannot get results after the first or second treatment, the treatment is useless." I feel there are many cases that can be benefited if you persist in the treatment. It is just the same old story of being swayed by over enthusiastic observers.

Effect of Ultra Violet Rays on the Different Radiological Aspects of Rickets. A. Laquerriere and R. Lehmann, *Journal de Radiologie et D'Electrologie*, XI, 4, 1927.

Certain children have arched limbs; these children are in general pale, fat, puffed, lymphatic; the radiograph shows neither a fringe on the terminal surface of the diaphyseal extremity, nor enlargement of the region of the joint is found. The curvature in these cases seems to be attributable to a laxity of the ligaments and to a hypotonicity of the muscles. In general actinotherapy, in these cases causes the disappearance of the general puffed up condition; the child grows, recovers the total tonicity of his body and his limbs straighten. There is no question here, in the author's opinion of a true rickets. The typical pictures of rickets are.

1. The fringe. This disappears, in general, very rapidly under the influence of ultra violet light.

2. The enlargement of the diaphyseal extremity. This enlargement is not, in itself, modified by the treatment. Only under the influence of the ultra violet light, the extremity ceases to grow whereas the rest of the bone levels. Also, at the end of a certain time, the relations of the different parts of the bone again become normal and the hypertrophy of the joint disappears. It is necessary for this that the bone has had time to develop, that is to say a considerable number of weeks.

In regard to the hypertrophy of the diaphyseal extremity, the authors remark that certain children

have an apparent incurving of the diaphysis; the extremity is hypertrophied above and below, only on the internal side, or only on the external side. The result of this is that one of the surfaces of the bone is concave. On palpation and on inspection, one also gets the impression that the diaphysis is arched. This incurving disappears little by little with the development of the bone as a whole.

3. Finally there exist true curvatures. On these curvatures the action of ultra violet is inconstant. It seems to the authors that the results are good, although slow, if treatment is begun immediately. On the contrary if treatment is begun late, not only are the results slow, but it also often happens that a complete cure is not obtained. Finally the statement is made that in those cases where there was very little fringe or none at all, no modification in the anatomical sense was obtained. They therefore conclude that in these cases there is no true rachitic malformation but a sequel of a cured rickets.

Experiments with Irradiated Ergosterin. A. Hottinger. *Zschr. f. Kindhkl.* 1927, 44, 3-4.

The antirachitic effect of irradiated ergosterin is confirmed in rats, dogs, children and adults. Cases include chronic rickets with manifest tetany, a premature case and two very advanced chronic osteomalacias with fractures and paralyses. In the adult the direct and indirect light therapy must be continued for a longer time.

PHYSICAL AIDS AS AN ADJUNCT IN THE TREATMENT OF CERTAIN EYE, EAR, NOSE AND THROAT CONDITIONS*

H. L. BROOKS, M. D., F. A. C. S.
MICHIGAN CITY, IND.

Only ten years ago, physical therapy was largely in the experimental stage. The apparatus employed at that time was lacking in mechanical perfection, and few physicians possessed the technical skill requisite to obtain proper results. The World War, however, gave a tremendous impetus to the development of physical therapy, both with regard to the improvement of the instruments and our expertness in their use. Today it may be said truthfully that physical therapy has graduated from the experimental class.

The use of physical therapy in the treatment of conditions of the eye, ear, nose and throat is a matter of recent development. I shall start immediately with the use of physical aids in the treatment of eye disturbances.

PHYSICAL THERAPY IN OPHTHALMOLOGY

Our principle interest with regard to the use of physical therapy in ophthalmology applies to the employment of radium. That the eye is tolerant to massive doses of radium, has been amply proved. Janeway and others have reported the use of very large doses without any ill effects other than slight burns of the lids. I can confirm this statement, as I have used radium extensively in the treatment of incipient cataracts without observing any untoward effects.

Until a few years ago, the use of radium in ophthalmology was largely confined to the treatment of malignant growths. In such conditions as sarcoma, epithelioma, rodent ulcer and glioma involving the eyeball or orbital cavity, the indications for radium are, of course, specific.

More recent observations have established the fact that radium has a specific action on the lens. Under its influence, lens opacities diminish. In 1914 Koster, of Holland, reported having "treated twenty different diseases, among other, cataracts, with negative results, but that in one case only, a case of cataracta caerulea, the opacities fell to pieces, and finally entirely disappeared."

With improved technic, other workers since Koster have had more favorable results in the treatment of cataract. In 1925 I reviewed the literature on this subject and also reported a series of cases from my own experience. My observations justified the conclusion that the application of radium, properly screened, does not injure the eye; that frequent treatments are necessary, especially at first; that opacities of the lens disappear under the influence of radium; that radium has a selective action on the lens; and that the use of radium in no way interferes with subsequent operation, should the latter become necessary.

I have been in the habit of using 49.92 mg. of radium element in my cases. The applicator consists of a specially designed brass and aluminum cup holding five radium needles, each of which contains a little less than 10 mg. of radium element. The eyebrows and cheeks are protected with a thin sheet of lead, measuring 1 mm. in thickness. With the applicator applied over the affected eye, the patient is told to look straight ahead. As the tissues of the eyeball are more resistant to radium than the skin, the condition of the eye-lid indicate the degree of reaction and thus safeguards the eyeball from the danger of overdosage. In other words, the

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eyelid will be burnt long before any injury occurs to the eyeball.

PHYSICAL THERAPY IN OTOLGY

Several different physical aids have been used with success in the treatment of ear disturbances. The forms of therapy that have been mentioned most favorably include radium and roentgen ray, quartz light, diathermy and zinc ionization.

In the treatment of epithelioma of the auricle, radium is of course the treatment of choice. It has also been used with good results for certain forms of deafness and tinnitus aurium.

The x ray is of unquestioned benefit in the treatment of chronic deafness. Numerous cases are reported to prove that the acumen of hearing is considerably increased by this method. However, we must be careful to judge our results not only by tuning fork tests but also by the voice and conversational tests; for the greatest improvement is in the ability to hear and interpret spoken language rather than in the perception of metallic sounds. Typical nerve deafness responds less favorably to roentgen ray treatment than that due to middle ear disease.

In many cases of chronic catarrhal deafness, benefit follows a reduction in the size of the lymphoid growths in the neighborhood of Rosenmuller's fossa by means of roentgen ray treatment. For this purpose, the whole tonsillar field and nasopharynx should be irradiated. The usual dose is 5 milliamperes, 80 kilovolts, 15-inch focal distance, 1 mm. aluminum filter, and four and a half minutes time. This is the so-called sclerolytic roentgen ray dose.

Closely allied to the roentgen ray in the treatment of aural disorders, is quartz light therapy. This treatment probably depends upon the bactericidal and tissue stimulating action of the extremely short ultra violet rays of the solar spectrum. Various forms of apparatus are now available which produce light rays of the same

length as and even shorter than the solar ultra violet rays.

For the relief of pain in acute otitis media, quartz light therapy is particularly valuable. In some cases the treatment is so successful that the need of incising the drumhead is obviated. However, when there is pronounced bulging of the membrana tympani, nothing can take the place of a paracentesis. In chronic purulent otitis media, quartz light diminishes the discharge and promotes healing. In tuberculous cases, it is a most important adjunct.

Diathermy is another important aid in the treatment of deafness. When a high frequency current is passed through, the resistance offered by the tissues generates considerable local heat.

The local heat produced by diathermy produces a considerable degree of hyperemia in the middle ear. In sluggish, underactive states of catarrhal inflammation, this activation is undoubtedly beneficial. It stimulates the reaction of the middle ear tissues and thus favors resorption. After each treatment, the patient experiences a grateful sensation of local warmth. The application should be made from twenty to thirty minutes at intervals of about twice a week.

Zinc ionization has proved to be a successful measure in overcoming profuse discharges from the middle ear. It is produced by injecting a solution of zinc sulphate into the middle ear cavity through the perforation in the drumhead and then passing a galvanic current through this solution. The positive electrode is made of protected zinc wire which fits snugly in the auditory canal. The negative electrode is a moist sponge held in the patient's left hand.

Treatments should be given at intervals of about twice a week. After the first treatment, one must be prepared for an increase in the amount of discharge; but this abates after the

second application and may disappear completely as treatment is continued. Results from zinc ionization in the treatment of chronic middle ear suppurations have proved good, especially in old discharging ears with large perforations.

PHYSICAL THERAPY IN RHINOLOGY AND LARYNGOLOGY

The most important application of physical aids in the treatment of conditions of the nose and throat has been the use of the roentgen ray for enlarged and infected tonsils. That the tonsil will actually shrink under x ray treatment, there can be no question. But, whether it is advisable to allow this form of treatment to take the place of tonsillectomy, is still a moot point.

There is one indication for the use of roentgen rays for tonsillar treatment on which all are agreed; namely, cases of infected tonsils in which operation is contra-indicated, as for example in hemophilia. If treatments are continued once a week for three or four months by this method, the tonsils may be reduced to a small piece of tissue just visible on each side of the fauces. Furthermore, it has been shown that roentgen ray treatment, by producing atrophy of the lymphatic structure of the tonsil, greatly restrains the growth of the hemolytic streptococci in the depths of the tonsillar tissue.

With reference to the choice between tonsillectomy and roentgen ray treatment in a case of tonsillar hypertrophy and infection, I believe that no single rule can be applied to cover all cases. Some advocate that all tonsils should be removed surgically; others, that x ray treatment should entirely supplant operative removal. But I believe that we must make a careful study of the individual factors in each case and that in many instances the best treatment is a preliminary course of roentgen ray treatments followed by tonsillectomy. In the various systemic disturbances in which operative interference is dangerous, such as blood dyscrasias or diabetes mellitus, the reduction of the tonsils and lym-

phoid growths of the nasopharynx by means of roentgen ray treatment furnishes a safe and efficient alternative to surgical measures. Experience has shown that many cases of rheumatism and beginning endocarditis clear up after roentgen ray treatment of the tonsils, just as after tonsillectomy.

The technic advised by Osgood, of Boston, for the treatment of tonsillar conditions is as follows: Lying face downward with a pillow under his shoulders, the patient turns his head first to the right, then to the left, with the chin raised in each instance. The ears are strapped forward, so that an oblique surface is obtained at the angle of the jaw for the unobstructed penetration of the x rays. A square foot of lead rubber with a rectangular cut in the center is placed over the patient's head for protection. The dosage is 5 milliamperes, 6-inch spark gap, and a focal distance of 10 inches. An aluminum filter is used. The time of treatments is six minutes, and the interval one week.

CONCLUSIONS

1. Recent studies have outlined many distinct fields of usefulness for physical aids in the treatment of diseases of the eye, ear, nose and throat.
2. The eye will tolerate massive doses of radium, and this element is our chief reliance for all malignant growths involving the eyeball or orbital cavity.
3. In the treatment of unripe cataracts, radium shows great promise. It does not interfere in any way with subsequent enucleation of the lens, should the latter procedure become necessary.
4. The roentgen ray is of value in many cases of chronic catarrhal deafness, especially when there are marked lymphoid growths in the neighborhood of the fossa of Rosenmuller.
5. Quartz light therapy greatly relieves the pain in acute otitis media and sometimes obviates the necessity of paracentesis.

6. Diathermy, by producing localized heat in the tissues of the middle ear, is sometimes of value in stimulating a healing and resorptive tissue reaction.

7. Zinc ionization has proved useful in cases of chronic purulent otitis media with profuse suppuration and a large perforation in the drumhead. Although the first result is to increase the discharge, subsequent applications result in a diminution, and sometimes all discharge ceases under treatment.

8. The use of roentgen rays to shrink enlarged and infected tonsils is a moot point. I believe that, in some cases, tonsillectomy is to be preferred; in others, x ray treatment. The one indication for roentgen ray treatment of the tonsils admitted by all authorities is in those cases in which operation is contra-indicated, as in hemophilia for example.

DISCUSSION

DR. THOMAS C. GALLOWAY (Evanston, Ill.): Dr. Brooks covered such a wide subject, I do not know where to start. It is tremendously difficult to evaluate the treatment of lens opacities. One cannot, as we see them in a large number of refractions, be absolutely certain that the treatment is accomplishing very much. I cannot, however, speak of radium. I have never used it, but I think this report of Dr. Brooks' is very helpful.

As to the treatment of epithelioma, radium is good, of course, in early cases. In extensive involvement as we see it at the County Hospital I have never observed radium to be of any more than a palliative benefit.

I have had no experience of my own with zinc ionization. When I contemplated the use of that treatment I was unfortunate in seeing cases which had been treated for subacute otorrhea in which there had been a very marked impairment of hearing, much more marked, I thought, than would have resulted from more conservative methods continued, perhaps, over a long period of time. There was one case especially, in which there had been a fairly large perforation so that you could see in the cavum tympani. Everything was plastered down. The impairment of hearing was such as you would get with complete fixation of the stapes, and it seemed to me that result on hearing was a serious thing, and I have not heard that mentioned. Of course, in a long standing case, with little or no hearing, that would be of no moment.

The question of tonsils should lead to a lively discussion this afternoon when Dr. Dillinger's paper comes up. I have seen some unfortunate results with the use of radium and surgical diathermy, for that matter, and I think the question of the treatment of the tonsils depends upon our conception of pathology of the tonsil. I don't think it is the large tonsil with much lymphoid tissue that does the harm. Those tonsils can certainly be shrunk. It is the scarred, small, buried tonsils, with much scar tissue, with closed abscesses, erosion of the crypt walls, phlebitis of the veins in contact, that give you trouble—the small, shrunken tonsils. The relation to focal infection is the important consideration in most of our tonsil operations. I do not believe that radium or x ray has accomplished much in this type of tonsil. I have taken out quite a few of them. They are hard to remove. The laboratory report is chronic, fibrous tonsillitis, frequently with closed abscesses. I think those tonsils are frequently very dangerous. You must seriously consider as an alternative to radium and roentgen ray, surgical coagulation of the tonsil. Under the improved technic this is at least a hopeful method.

For status lymphaticus, with very large lymphoid hypertrophy, I think the x ray is a very fine thing. I have seen cases which responded very well indeed to the treatment.

DR. L. A. LANE (Baltimore, Md.): I have been working with radium for a number of years and am probably one of the first workers in this country in certain lines of work, particularly ophthalmology. I have to take exception to this enthusiasm about cataract, particularly with this new lens photosensitization which we are making use of and which others before us have made some use of. I think all of these things as well as the individuality of the patient's chemical reaction should be taken into consideration in the study of cataracts.

It is necessary to make a survey of every patient to find out the cause of the cataract. With the slit lamp we can find out cases in which the cataract is non-progressive. We do not need to worry the patient about those cases. They may remain that way for years, and it is possible that in that type of case radium will do some good. I have used radium in cataracts, and I still use it, but I am exceedingly careful to select my type of case. I do not want anyone to go away from here with the impression that radium is without harm, or may not produce cataract, for there are plenty of cases on record where radium has produced cataracts, particularly in malignancies about the antrum or about the head. There is any number of those cases which have not yet been reported, which we frequently see in consultation.

I also think we can get other injuries from radium. I am not so certain about the problem of glaucoma. I would not think of applying radium to a glaucoma case. I will admit you may reduce the tension for a short time, but you get quite a number of glaucomas following the use of radium.

I cannot consider radium as a specific in cataract. I believe certain cases, particularly the ones of childhood, can be almost entirely absorbed.

I find in cases of high myopia, which are very frequently accompanied with cataract, that there is considerable improvement. We not only get improvement in the vision but we get improvement in the media. I have found the greatest usefulness of radium, outside of the malignant conditions, as in ulcers from various infections. I am not quite so sure, since my research work two years ago, of getting deep enough penetration in these to reach the posterior lens opacities.

I have used radium a great many times in nasal polypi, particularly after operation. I know of nothing that will give the relief in these exceedingly painful sphenoids as quickly as radium.

DR. H. L. BROOKS (Michigan City, Ind.): I am very glad to have had the opportunity of hearing Dr. Lane's work on this. I happened to know something about her work; in fact I think I sent her a reprint of

the paper written two or three years ago on this same subject.

Some years ago Cohen and Levin of New York did a good deal of work with radium in cataracts and that was followed several years later by the work of Franklin and Cordes of San Francisco. Their reports were about 87 per cent improvement in their incipient cataract cases. I followed that work closely soon after Cordes and Franklin made their report. My experience has been just as I have told you. The vision in all of these cases is taken before and after each treatment. We can only go on what the patient tells us the vision is. Some of these cases had vision of less than 20/200 with spoke-like cataracts in each eye that have gradually disappeared. These cases were watched for at least two years.

I have never used radium for glaucoma. The fact that the radium sometimes causes maturity of the cataract is no indication for not using it. After using radium and causing maturity they can be removed surgically without any difficulty. I have used radium in corneal opacities for the past four or five years with results that Dr. Lane has related.

In nasal polyps, after removal, I use 25 to 50 milligrams of radium in the nose, according to the method of Dr. Harold Lillie of Mayo Clinic. In hyperplastic sphenoiditis it is also advantageously employed.

Efficiency and Limitations of Cholecystography. B. R. Kirklin, M. D. *The B. M. and S. J.*, Vol. 197, No. 32, Feb. 9, 1928.

The author makes the following summary of his paper:

Graham's contribution to medicine has given us the most valuable and dependable single laboratory method of diagnosing gallbladder disease. He deserves unstinted praise for his splendid work.

Cholecystography, when the dye has been given orally, should be correct in a high percentage of cases, if careful technic is used and the results are properly interpreted. The method is very accurate in cholelith disease accompanied by stones. The invisible sign with standard technic is a reliable indication of gallbladder disease while the faint-shadow sign ranks not far behind. On the other hand, I believe that either the oral or the intravenous method is likely to err in cases showing only slight pathologic changes in the gallbladder. In reviewing the published results of other workers as well as my own, I am convinced that a negative or normal cholecystographic response is the least reliable of all signs, since the percentage of error

varies from 26 to 30 per cent. It must be remembered that cholecystography is preeminently a test of gallbladder function rather than a method to depict actual disease of the gallbladder. The identification of stones as shown by negative shadows is the single exception.

I believe that for the present, at least, cholecystography should not be relied on without other data to affirm or deny the presence of gallbladder disease. Quite on the contrary, I strongly believe that positive cholecystographic data should be supported by a history and observations suggesting cholelith disease before a patient is subjected to operation, as a patient with a normal cholecystogram may have a history characteristic of gallbladder disease which is confirmed at operation. That cholecystography is a help is an established fact, especially in doubtful cases, but the family physician or clinician must gather all the evidence together, including that obtained by cholecystography, and carefully weigh it before making the final decision.

I feel sure that with experience and the diffusion of knowledge, cholecystographic diagnosis will attain an accuracy even greater than it now has and will become indispensable.

THE SCOPE AND LIMITATION OF PHYSICAL THERAPY IN GENITO-URINARY DISEASE.*

CLINTON K. SMITH, M. D.

Instructor in Urology, University of Kansas, School of Medicine.

KANSAS CITY, MO.

Diathermy and other physical therapy are rather new things, and the odium of quackery has been attached thereto until rather a recent date. Probably, owing to this, a good many conservative men have waited for developments, but I think at the present time we have had sufficient experience with this line of therapy to be able to draw some conclusions with regard to its usefulness and limitations, and it is of this I wish to speak in discussing the place this line of treatment has in genito-urinary diseases.

In the treatment of genito-urinary diseases with physical therapy our field is considerably limited. We do not have as wide use of it as do men doing general work. I will say in a general way that the only part of physical therapy that I have found of practical use to me in the treatment of genito-urinary diseases is high frequency electricity; with the possible exception of the mercury arc lamp, of which I will speak later on.

The use of high frequency in the treatment of genito-urinary diseases can be divided into two phases, according to its use and application—surgical and medical.

SURGICAL APPLICATION.

The use of high frequency electricity from a surgical standpoint is not new in the field of genito-urinary diseases. Its use in this field has probably had an earlier application than in any other field of medicine. Sixteen years ago, Edwin Beer of New York, applied high frequency through the cystoscope to bladder tumors, and immediately revolutionized the treatment of

these lesions, inasmuch as he was able to destroy them for the first time without opening the bladder, but although these tumors are rather rare in the general run of practice, sooner or later you are certain to encounter such, and it is of extreme importance to be able to recognize the lesion and to be able to inform the patient in regard to his outlook and the treatment. It is, indeed, a very important lesion to the patient. While these tumors are benign in the early stages, they are potentially malignant, and if not destroyed most of them become clinically malignant with the end results of any other form of malignancy. The outstanding symptom is a sudden, painless hematuria, usually profuse. Seemingly—it has no relation to exercise. It may occur while the patient is lying quietly in bed. The blood is more likely to be clotted than when hematuria is due to lesions higher up, involving the kidneys. The urine often contains shreds from the tumor, from which the diagnosis can be made. When one encounters a sudden, painless hematuria which continues perhaps for a few hours or a few days and which ceases as suddenly as it began, bladder tumor should always be suspected, of the papillomatous type. A tentative diagnosis can be made in this way, but to make a definite, final diagnosis, cystoscopic examination is essential.

Not all cases of papilloma of the bladder can be treated through the cystoscope, because we don't see them early enough. I have had two cases recently, in which there was a rather definite history, extending back over a period of about eight years. The bladders in both instances were filled with papillomata and could only be treated through open operation. In this way, we open the bladder with a cautery knife,

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cauterize the larger tumors with the actual cautery, treating the smaller ones with the application of high frequency, following up the treatment at intervals after the bladder closes by inspection, and the application of the spark to any recurrences which may appear.

This type of high frequency is designated as fulguration. When Beer first used it, he attacked each branch of the tumor separately, with the monopolar current. We now feel that we get the best results by applying the bi-polar current to the base of the tumor, in the attempt to destroy most of it at one sitting.

The Hard, Infiltrating Type of Tumor. In contrast to the tree-like, branching papillomatous tumor of the bladder we have another type of tumor, which in contrast, is a hard, infiltrating mass, carcinomatous and definitely malignant from the beginning. This type of tumor demands a variation in our electrical technique. In this type of tumor we open the bladder immediately, and with the bi-polar current, apply a round, disk electrode to the tumor. Our treatment in this case is not an attempt to carbonize tumor as in the treatment of papillomata, but merely to blanch the tissue. It is well known that cancerous tissue is less resistant to heat than normal tissue, and in this way the tumor can be destroyed without injury to the surrounding tissue. The idea is to simply blanch the tumor tissue and not carbonize it, avoiding the incident sloughing. This is a rather recent technique, but our experience with it thus far, indicates that in all probability, its use will be attendant with the same degree of success as has the application of fulguration in the treatment of papillomata. This is a distinct advance and offers the patient a new hope, inasmuch as this type of tumor has been treated previously either by resection of the bladder or the application of radium, both of which have given unsatisfactory results.

I had the opportunity of seeing recently the bladders in two cases, in which a definite labora-

tory diagnosis of carcinoma was made, in which electrocoagulation—which is the term which we use in designating this form of treatment—was applied. These bladders were secured at autopsy following automobile accident, and after two years, microscopical examination of the tissue at the site of the previous tumor involvement was definitely normal.

Endocervicitis. The next thing of which I wish to speak is the treatment of endocervicitis. The greater part of my experience in this class of case is in the treatment of gonorrheal endocervicitis, and I will say that aside from the use of the actual cautery, that the application of diathermy is the first thing of real practicability we have had with which to really get anywhere in the treatment of gonorrheal endocervicitis. The gonorrheal female does not take the interest in her treatment as does the male. Obviously—self treatment in women is not practical as in men, and therefore—they are almost entirely dependent upon being treated by the physician. In my experience—it has been difficult to induce them to come often enough and over a sufficient period of time to consistently obtain a cure. The technique used by me is practically the same as described by Corbus—with the use of his electrode in the cervix which carries the thermometer, giving us an accurate idea of the temperature of the electrode. This should be maintained at approximately 47 degrees centigrade, over a period of 30 to 40 minutes at a sitting. The indifferent electrode which I have found most practical is a band of block tin about the waist about 4 inches in width. In our early experience, we used a large, abdominal, indifferent electrode, and found that we were often getting a more intense heat at the anterior part of the cervix. The indifferent electrode as a band about the waist, gives us an even distribution of the heat from our cervical electrode, which is obviously much more efficient. As a usual thing, the treatment is followed by a profuse, water, often blood tinged discharge from the cervix for a period of from five to seven days. The treat-

ment should be repeated at intervals of seven to ten days, until the secretion remains negative for the gonococcus, which as a usual thing, is not found after the second or third treatment.

I wish to speak of one other thing in this connection, in the surgical use of high frequency, and that is—intreating gonorrheal urethritis in women. In treating the main or principal infection in the urethra, we must consider it as a medical treatment, but in many of these cases, the infection is maintained because a persistent infection remains in Skene's ducts, which open just inside the lips of the urethra. Very often pressure made with the finger under the urethra expels a small drop of pus from these ducts. In such instances, a small wire introduced into the duct as high as possible, and the high frequency current turned on in flashes, is sufficient to thoroughly carbonize the ducts. One such treatment eliminates completely this infection, and I have had numerous cases in which a persistent urethral infection promptly cleared after the elimination of this focus.

In the male we often have a persistent morning drop with shreds in the urine, in which, by examination of the urethra by urethroscopes, it can be seen that Littre's ducts along the roof of the urethra are the cause of persisting discharge. They can be seen as a row of small, red buttons and the treatment in this case is similar to that described in Skene's ducts in women, in that a small wire is pushed into the duct and several flashes of high frequency are sufficient to produce carbonization.

THE MEDICAL USE OF HIGH FREQUENCY.

I believe that it is in the medical use of high frequency that the term "Diathermy" is really applicable. From the standpoint of the treatment of genito-urinary diseases in my experience, the application of diathermy has known its greatest triumph in the treatment of epididymitis has been one of the most troublesome things we have had to deal with in treating gon-

orrhea in men. Usually—with the older methods of treatment—the patient was confined to his bed from one to three weeks and usually about half efficient for his occupation for a similar period afterwards. One of our methods of treatment previously has been to open and drain the epididymis which gave the patient relief from pain, but necessitated confinement to the hospital, with the incident expense and loss of time. With the use of diathermy, I have had a good many patients who have had to be helped in to the office, and who—after one treatment—would come walking in, on the following day, apparently without distress. Almost without exception, these men are able to continue with their occupation without interruption. Recently I was called to see a man who had been at home in bed for more than a month with epididymitis. Three treatments relieved him sufficiently that he was able to resume his occupation. This treatment is very useful in cases of persisting chronic pain in the epididymis following gonorrheal epididymitis, and although the results are not as spectacular and are not accomplished as quickly, treatment in these cases at intervals of three to four days, ordinarily relieves the patient of his distress within a few weeks' time.

In regard to the technique. It is very difficult to maintain the application of electrodes to the scrotum. Corbus of Chicago has contrived a clamp electrode which works very well. This consists of two metal disks held by a hard rubber clamp, which—when adjusted to the scrotum—the patient is able to hold and maintain in place during the treatment. In order to get results in the relief of pain in epididymitis, it is quite necessary to apply the technique in a certain way. The treatment should be given with a low milliamperage and should be gradually increased until a moderate degree of warmth is experienced by the patient. This should be maintained for a period of approximately 40 minutes, when the milliamperage should again be lowered gradually over a period of 10 min-

utes. It has been my experience that better results are obtained if the milliamperage is not raised beyond the extent of moderate warmth and used over a longer period of time. In other words, better results follow a 45 minute treatment with moderate warmth than a 30 minute treatment with increased heat. Treatment should be repeated every day until the symptoms subside, gradually lengthening the intervals of treatment until all swelling and soreness has disappeared.

Prostatitis. My results in the application of diathermy in prostatitis have not been encouraging, especially in the acute attacks of prostatitis, following gonorrheal infection. In these cases I have not been able to get the relief from pain as in epididymitis, and have found it necessary in most instances, to put the patient to bed, with sedatives, until the acute condition subsides, and then go ahead with the usual treatment of prostatic massage, etc., along with the use of diathermy, which I believe shortens the course of treatment. There is one class of prostatitis, however, in which diathermy is distinctly useful, and that is in some of the cases of benign enlargement in old men. In a good many instances, owing to the obstruction from the enlarged prostate, edema and inflammation of the prostate and surrounding structures occurs. In several cases I have had this experience. After opening the bladder for a preliminary drainage, in prostatectomy, I have noticed that on re-entering the bladder to remove the prostate, ten or twelve days later, that the prostate had shrunk to within about half of its previous size. There is no question but that the reduction in size was a result of the reduction in swelling and edema—which, in other words—was an acute congestion and swelling, incident to obstruction. In these cases, the application through the prostate by placing an electrode in the rectum and a large indifferent electrode on the abdomen, results in a reduction of the edema and congestion, very often relieving the patient of his urinary frequency and dif-

ficulty. Treatment should be applied daily, until symptoms subside, gradually lengthening the intervals as improvement occurs. While I am firmly of the conviction that cases of prostatic enlargement showing difficulty or urinary symptoms should be operated upon, still, there are a good many who can be relieved by local treatment, including diathermy, and who probably—if kept under observation and occasional treatment—would live as long as other men of similar age who have no prostatic obstruction.

The application of diathermy in this way often spoils the chance to sell the patient a prostatectomy and robs the surgeon of a handsome fee, but preventive medicine is playing such tricks on us with increasing regularity.

Salpingitis. Any of us who treat gonorrheal infection in women are prone to inherit salpingitis. What we are probably treating in addition to salpingitis, in a good many instances, is a cellulitis of the surrounding structures. Here again diathermy has stepped in and pushed aside the surgeon in many cases. It is astonishing to observe in many cases the almost immediate relief of pain and the gradual reduction of the swelling, which, on first examination, with its hardness, size and soreness, would seem almost an impossibility without operation. But in most instances diathermy may be given a trial and if unsuccessful, an operation may be done later. I have had the best results in these cases by putting the patient to bed for a few days with ice packs and allowing things to cool off a bit, following this with the application of diathermy, gradually lessening the intervals of treatment as the symptoms subside. In these cases I have had more satisfactory results in using a lower milliamperage over a longer period of time, in about the same way as in epididymitis. One of the best electrodes in my opinion is that devised by Chapman, which is introduced into the vagina, placing it beneath the cervix, with a large block tin indifferent electrode upon the abdomen, extending well out to the sides.

Gonorrheal Urethritis in Women. This has been a most difficult thing to treat in women, for the same reason as set forth in the discussion on endocervicitis, in that it is difficult to induce the patient to come sufficiently often and over a sufficient period of time to produce a cure. Diathermy has come to our assistance in these cases. In my hands the application of diathermy to urethritis in women has materially shortened the course of the disease, and I have also been able to effect cures with much more regularity than previously. The technique used is as follows. A large, indifferent waist band electrode is put on as described in the endocervicitis cases, a Corbus electrode is introduced into the urethra, and with the thermometer in place a temperature of 43 degrees centigrade is maintained for 45 minutes. Treatments should be continued at intervals of two to five days, according to the tolerance of the patient. Women tolerate urethral instrumentation much better than do men, and there is really very little reaction following treatment. These treatments should be supplemented by daily irrigations or instillations of some silver preparation, similar to the line of treatment used in the male.

I will say—in passing—that I do not believe that the introduction of electrodes for the use of urethral diathermy in the male is practical—at least—it has not been proven so in my hands, inasmuch as severe reactions and complications are prone to occur incident to the traumatism produced.

Renal Pain. After ureteral catheterization, pyelography or dilatation of the ureter, incident to the treatment of structure, we often have severe reactions, with severe pain in the kidney region. This often persists for several hours to several days, and the application of diathermy has given my patients wonderful relief in many instances. I have had this experience. In several cases in which chronic pain in the region of the kidney has persisted for several years, with only moderate improvement with dilatation of the ureter, the application of diathermy at intervals of a week or ten days, in conjunction with the ureteral dilatation, was followed by immediate relief. I believe that in cases of renal

colic, the period of soreness and distress incident thereto following the acute exacerbation can be materially shortened by the application of diathermy. The technique used is as follows. A block tin electrode—four or five inches in diameter—is placed over the kidney region, and a large block tin electrode over the abdomen and sufficient milliampereage used to produce a moderate degree of warmth, extending the treatment over a period of 40 to 60 minutes. Treatment should be repeated daily until the soreness and distress disappear, gradually lengthening the intervals as the improvement occurs.

Ultra Violet. There is just one other thing I wish to speak of in passing, and that is—the use of ultra violet. Obviously—the use of this is rather limited in my field of endeavor. I have found it useful as a general tonic in post-operative cases of tuberculosis of the kidney, chronic pyelitis in children, and following prostatectomy, where the blood picture and vitality is low, and a general tonic is desired.

Just a word regarding chronic pyelitis in children. This is a phase of urology which has received very little attention until recent years, but we are beginning to realize that the urinary tract in children is often involved in the same pathological processes as in adults. We find that the persisting cases of chronic pyelitis are a result of obstruction, producing stasis of urine in the kidney pelvis, and that success in treating these cases is dependent upon establishing free ureteral drainage by catheterization and dilatation. While most cases of pyelitis in children show a tendency to recover with medical treatment, I think more so than do adults—still, it is highly important to realize that persisting cases are a mechanical problem, and should be dealt with accordingly.

Chancroid. Most of the cases of chancroid which I see are in my clinics and not in private practice. They are difficult cases to treat, and I have found that the application of ultra violet—concentrating two or three minutes on the ulcers, produce astoundingly good results in the limited number of cases which I have had an opportunity to observe.

RECTAL DISEASES TREATED BY PHYSICAL THERAPY*

GEORGE J. OTT, M. D.
BOSTON, MASS.

(Surgical diathermy and desiccation the treatment of choice in hemorrhoids, internal and external, polypus, fissure, ulcer, early cancer, fistula and prolapsus. Indications for other modalities.)

Probably no single class of diseases causes more real suffering and long continued discomfort, directly at and remotely from the locus of pathology, than diseases of the anus and rectum.

Patients frequently suffer from this class of diseases longer than should be necessary because of pronounced symptoms referred to distant organs, so that the source of the pathology is not recognized early. We physicians should consider it incumbent upon ourselves to include a careful proctological examination in our routine, especially where the nervus system is involved.

Anatomy:

(a) The circumanal integument contains sebaceous and sweat glands and hair follicles; is about 1 ½ inches in circumference, and may be dilated to four or five times this size.

(b) The anal canal extends from the linea dentata to the lower edges of the semilunar valves guarding the crypts morgagni, about 1 inch deep, lined by transitional epithelium which gradually changes to goblet cells of mucous membrane at its junction with the rectum and the linea dentata.

Surrounding the mucous membrane is a membrane of cellular tissue, then one of muscular layers composed of the external sphincter, the levator ani, and the lower part of the internal sphincter.

The external sphincter is the principle muscle with which we have to deal. It goes to form the anal canal and is normally in a state of contraction. The nerve supply to this canal is from the third and fourth sacral nerves, a superficial branch from the internal pudic and a filament from the fifth and sixth sacral the lesser sphincterian nerve, which latter is of extreme importance in local anaesthesia.

The rectum is a hollow tubular organ 5 to 6 inches long, which begins at the upper portion of the anal canal at the junction of the crypts of morgagni and anal papillae. The latter appear as a line of saw toothed triangular projections encircling the anal canal, the linea dentata.

Inflammation here causes discomfort and pain out of all proportion to the apparent or visible pathology.

At its upper portion the rectum is joined to the sigmoid flexure. It is here covered by peritoneum. It has folds spirally arranged called valves of Houston, and has four coats, mucous, submucous, muscular and peritoneal.

Ulceration on the upper surface of the valves of Houston are often overlooked, their consequent swelling producing a narrowing of the lumen of the rectum and obstructing the passage of the feces, often with a form of constipation and impaction of feces called dyschesia. The act of defecation is controlled by the levator ani and the external sphincter muscles, sometimes partially paralyzed, more often thrown into a state of tonic contraction, with much pain.

The rectovesicle pouch, in men, and the Douglas pouch, in women, are very important structures and the seat of rectal pathology.

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The sigmoid colon extends from the upper part of the rectum to the lower part of the descending colon. It is sometimes invaginated into the rectum, but is very often in a state of spasticity with cramp-like pains in the lower left groin and over the bladder, at other times it is the seat of ulceration.

The blood supply to these parts is from the superior middle and the inferior hemorrhoidal vessels.

Nerve supply: As the rectum is not supplied with sensory nerves, especially the upper half, much advanced pathology may be present before the patient seeks relief, a point worth remembering. On the contrary the anus, the anal canal and the lower part of the rectum are plentifully supplied with sensory nerves.

This accounts for the apparent lack of pain when the rectum proper is seriously diseased and, per contra, the intense suffering from lesions in the anus and the anal canal, which area is supplied with sensory nerves from the sacral plexus and the third and fourth sacral N. The lower sphincterian are the principle nerves in the rectum, and emanate from the sympathetic branches of the mesenteric and hypogastric plexus.

It has been estimated that one out of every seven persons suffers from some rectal disease.

As to symptoms: Pain most frequently prompts the patient to seek relief. This may be at the anal orifice, the lower two inches of the rectum or the anal canal, and may be sharp, sudden, paroxysmal, burning, throbbing, dull, aching or cutting.

Sharp pain, acute, cutting or stinging, coming on at stool, or just following, points to a lesion in the anal canal. Often times, however, sudden darting pains in the intervals between stools point to pathology in the same region.

Throbbing pain indicates acute or sub acute inflammation.

It may be a perineal or a perirectal abscess and is often accompanied by slight fever and leucocytosis.

Pain of a dull aching character, constant or intermittent, is usually caused by hemorrhoids, polypus, prolapse, fistula, ulceration of rectum, rectal adenoids or cancer.

Rectal diseases may progress to an astonishing degree without causing much local pain, especially if situated high up in the rectum, because of the lack of sensory innervation. However, pain may be referred to a distant organ, or part, i. e., the sacral region of the back, uterus, vagina, bladder, urethra, penis or scrotum, up to the inguinal or down to the sciatic region.

Tenderness in the circumanal region usually points to abscess, fistula, inflammation or ulcer of the anus.

Anal spasm, with very intense suffering may be caused by anal fissure, ulcer, abscess, or foreign bodies, such as a fish bone or a hidden and imbedded apple core. I have seen three cases of the latter.

Profuse or slight bleeding, a most frequent symptom, calls for a thorough examination of the rectum and sigmoid. It may occur with the stools, at intervals between, or immediately following. It may be pure blood, clotted or mixed with feces, and is usually caused by (a) local diseases, such as: ulcer, fissure, polypus, chancroids, cancer, stricture, fecal impaction, chancre, internal hemorrhoids, proctitis with small ulceration, amebic dysentery, or more rarely, prostatic calculus or abscess; (b) traumatism, (c) following operation.

Rectal hemorrhage, though slight, calls for a proctoscopic visualization, with illumination, to discover the cause. Itching points to some anal or rectal inflammation. Sacral back ache is often the first symptom of hemorrhoids, prolapse or impaction. General disturbances are

numerous, varied, and may be referred to any of the internal organs.

This brief outline of pathology encountered, with the symptoms enumerated, may serve as a guide to appropriate treatment, whether medicinal, surgical or physical, each in its proper sphere and place. Frequently physical therapeutics will be the treatment of choice, since relief can be given more speedily.

Surgical: Under this group come all ulcers, fissures, and fistulae, and, if within reach, these can be safely and satisfactorily operated upon, using desiccation or coagulation. The more expert one becomes with these methods the more sure he is of success.

Hemorrhoids, both internal and external, polypus, tumors, varicosities, are also relieved in the same manner with results gratifying to both surgeon and patient.

The pathology varying in degree and kind, as well as location will require a different selection and combination of modalities. This is self evident. Mild diathermy applied by means of a metal electrode, 4 by 7 inches, over the sacrum or the abdomen, and a metal electrode 2 inches in circumference and $4\frac{1}{2}$ to 6 inches long (preferably hollow) in the rectum, each electrode being attached by a cord to opposite poles, with a current of from 400 to 800 m. a. passed through the pelvic area, will give decided relief in most cases of proctitis without stricture, with or without prostatic involvement, in ulcer, and even those cases of itching and burning that are so annoying, as well as many concomitant symptoms referred to distant organs.

Vibration, using a conical glass electrode, with mild pressure and slow speed, for 3 to 5 minutes, will relieve local spasm, itching and throbbing. This will act as an anaesthetic and is very useful preceding local anaesthetic infiltration. While the use of the high frequency vacuum electrode is considered by some to be not entirely safe, on account of the liability of

breakage, it is very soothing in many cases of rectal pathology.

Galvanism is assuredly indicated in dyschesia, atonic rectal or sigmoid musculature, or partial paralysis of rectal circular fibre or anal distension of sphincter muscles. The writer first injects 8 ounces of normal salt solution, to be retained throughout the 15 minute treatment, then inserts the rectal electrode (copper), attached to the positive pole, having a covered mesh electrode, placed over the lumbar or sacral region, attached to the negative pole, using 10 to 20 m.a. of current.

In hemorrhage the location, origin and character must be the guide as to the modality chosen, i.e., hemorrhoids, fissures and ulcers undoubtedly require desiccation or coagulation.

Proctitis calls for diathermy, with the metal electrode inserted; prolapse, for positive galvanism or paralleled striated electro-surgery of mucous membrane of the anus and lower rectum; polypus, desiccation; stricture, negative galvanism, gradually increasing the size of the electrode to obviate the danger of scar tissue forming more stricture; cancer, electro-surgery, if young and circumscribed; fecal impaction, cleansing and tonic positive galvanism; chancroids and chancre, make blood examination (Wasserman) employ treatment indicated according to location; perirectal abscess, incision, drainage; prostatic abscess, drainage into the rectum, if possible, and diathermy and galvanic tonic treatment.

The anaesthetic, antispasmodic and solvent effects of the Tesla current, bipolar, make it most beneficial in the treatment of anal fissure, using a cone shaped metal electrode in the rectum, with a larger flat metal electrode on the abdomen or back, each attached to opposite poles, the current of comfortable tolerance, time about 10 min.

Any fissure that can be seen, whether with or without the speculum, should be desiccated entirely.

Fistulas should be treated in the same manner, although more skill is required, here, to desiccate the entire tract.

With hemorrhoids, external or internal, first remove the toxins from the body. Treat the liver by means of diathermy, front and back, daily, if possible, for about a week. Clean out and strengthen the gastro-intestinal tract, then desiccate.

Technique: Thoroughly anaesthetize the area of the anus, using a 2% solution of urea hydrochloride of quinine, making the injection at points about an inch from the anus, first near the skin, then deeper, to block the sphincter nerves so that the sphincter may be dilated. after dilatation the hemorrhoid may be pulled down, clamped, and desiccated close to the clamp. The mass may then be scissored off without danger of hemorrhage. A soothing suppository may then be inserted, and this may be repeated as often as may be required. Less pain is felt after the use of the urea, but some hold that there is danger of sloughing. I have never seen any, however.

With an external hemorrhoid no clamp is required. Anaesthetize the base of the pile with a 2% solution of procain with epinephrin. If it is small the whole may be desiccated until it changes to a light yellow. If pediculated, only the base will need desiccation, when the rest may be scissored away. There is no rule for dosage. The color will indicate when enough has been used. No post operative treatment is required. Healing takes place shortly.

Hemorrhoids, fissures, and ulcer of the rectum may also be treated successfully with the static effleuve.

Use a vacuum electrode which will slightly distend the anus, such as Dr. Mary Arnold Snow's hemorrhoidal electrode, positive current, 15 minutes, daily or three times per week. Keep the bowels open. This is especially efficacious in distended hemorrhoidal veins.

CONCLUSIONS

(a) Rectal diseases, so common among the more civilized races, cause much long continued suffering, waste of time and loss of money.

(b) Most rectal diseases are amenable to treatment by physical therapy, combined with proper hygiene, proper diet and common sense attention to defecation, elimination, and medical treatment, if indicated.

(c) Surgery by means of the knife, cautery, or the injection of chemicals, in diseases of the anus and rectum are rapidly becoming less popular, as electro-surgery proves itself more efficient.

DISCUSSION

DR. WILLIAM BENHAM SNOW (New York City): I am sure that this paper has been so comprehensive in its scope and so scientific in its details that I can add very little. Dr. Ott has covered the ground very well.

With reference to the treatment of fistula his idea of desiccation after the old method used in the tissues between the rectal wall and the back of the fistula is very important. If there is any reason that these cases do not heal up properly it is because this is not done. I have had some success with a few cases in using galvanism in the fistula where I could get the copper electrode through into the rectal side. By using the copper electrodes these are cases that are pretty close to the anus and then while it is adherent using a rather rough procedure just pull it out and it will make a raw surface. Under local anesthesia it will not cause severe suffering and they will heal up a lot better if you are conservative in the removal. There is always this difficulty. The fecal discharges are so liable to get into this canal that there is no certainty of success. I have had two cases relieved in one treatment. I think the method described by Dr. Ott is much better and more certain.

With reference to using any method of static treatment in hemorrhoids, it would be applicable only in the sporadic cases when there is no development of large hemorrhoidal veins which cannot be effected in that way at all satisfactorily. In those cases that come on in that way they are always due in my judgment to a condition of the liver. Of course the circulation of the hemorrhoids unfortunately is such that the liver connection is very close to the hemorrhoidal vein and the liver being the organ that creates the trouble I use the static wave current over the liver. It is just

that one group of cases I can give any enthusiasm to. I think the method of desiccation in the treatment of hemorrhoids has already established itself beyond question.

I saw a clamp here the other day that strikes me as one of the best. Two long projecting prongs of hard rubber will clamp the hemorrhoid and then by desiccation following the line through the groove, the hemorrhoid will be destroyed and seared off. I can suggest some improvement, for if it were flat instead of round that would aid. Another thing would be a means of closing it so that when adjusted it would hold itself against the hemorrhoid tight enough so that it would be held in place. I suggested that to the one who exhibited it and I think that would make an excellent electrode. When you have any metallic connections you are so liable to get sparks on yourself or the tissue around you that it is very important to have some such protection. That method I think is better and bound to be the coming method of treating hemorrhoids. The beauty of it is that the patient can have the treatment in the office and then go home after a little rest. There is very little danger of secondary hemorrhages. Some of the strongest arguments in favor of this method is that there is no scar tissue formed. The point raised by Dr. Ott in the treatment of scar tissue by the negative pole was very apt.

With reference to the salt solution in the rectum, if you want to get a quick evacuation, instead of using the positive pole which he was using to get tone to the mucosa, if you use the negative pole you will get very prompt evacuation. Where you have a case of constipation that persists and there does not seem to be any reason for it you can get very prompt evacuation by means of the negative pole in the rectum with the salt solution.

DR. ARTHUR L. BROWN (Winchester, Mass.): I appreciate Dr. Ott's paper from the point of generality, for there is no physician who does not have the cases come in to him constantly as those touched upon by Dr. Ott in his paper.

Referring to the treatment of hemorrhoids, I have been very much interested in the later methods and I am using a clamp now called the Bierman clamp. One of the first cases I operated on was such a startling revelation that I could hardly believe it. Yet as time has gone on I have accepted a recognition of the fact. This man had a secondary anemia, about 2,450,000 red cells. He had been troubled with hemorrhoids for five or six years. The anal ring was dilated and it looked as if he had five or six ordinary English walnut sized bleeding hemorrhoids. That is a very graphic picture of

what was presented to me for treatment. He came to me on Saturday afternoon at that was the day he was free from employment. I introduced with a small syringe such as we use in our cystoscopic work, a one and a half per cent solution of novocain, into the anal opening. Before I had the opportunity to treat him by local anesthesia in the usual way I was amazed at the wonderful relaxation of that sphincter muscle and the inversion of those hemorrhoids in all of their gruesome infected aspects. As that anal ring dilated, blood immediately dripped on the floor continuously. We removed those by the Biermann clamp and although I have not seen the clamp Dr. Snow refers to it does not give you any support after it is adjusted.

I think the success by that method depends absolutely on two factors. We have a so-called coagulating current but we have no way of reading it on the meter. The only way is to take a piece of meat and bring the current up until you get a white line. If you go beyond the coagulation you miss absolutely the successful issue so far as the Biermann clamp is concerned. You have to try it out and set your machine before you proceed. That was the only anesthesia I used. Then I grasped each individual hemorrhoid, drew it up and clamped my clamp on, stepped on my foot switch until I got a reasonable sputtering and a coagulation, clipped off the pile through the clamp. That seals up your two layers and it seals it up beautifully. We took off those five hemorrhoids the size of an English walnut. He got off the table, went home, rested on Sunday and went to work Monday against my advice. I told him I would like to have him present himself the following Saturday and I was astonished at the wonderful repair and the approach to a pretty normal anal ring. I asked him to come again the following Saturday and he was all well. He said he had a little pain for the first twenty-four hours and was somewhat aggravated while on his feet for the first two days but outside of that he was comfortable for the first time in fifteen years.

DR. FRANK E. STOWELL (Worcester, Mass.): This is a subject of a great deal of interest and has been covered rather fully. In my personal experience I often began to wonder whether I see so few cases or whether the whole subject of rectal diseases cannot be simmered down to a rather simple foundation. In other words we have the hemorrhoidal veins, due to no end of constipation, liver conditions, pregnancy and other causes which I haven't mentioned, that tend to become varicose. That means congestion, poor nutrition. It is a good starting point for a more or less acute chronic, low-grade inflammation called pruritis. In that condition I have found very satisfactory results by the use

of a fair sized copper electrode. In fact I have had some made which are the same as the vaginal electrode the Morse Wave Company puts out. I wipe this over with nitric acid, dip it in water and have a beautiful, bright surface. I use that with the positive pole, five to ten milliamperes for five or ten minutes. The cases I have seen I have sterilized the perianal skin in the chronic or subacute pruritis and get very satisfactory results.

The next stage you get after it is advanced it what we call piles. You simply have a dilatation of the veins and if it goes on far enough you get such a condition as Dr. Brown has just described. The cases come to me for simple congestion. It is simply a continuation to an extreme in such cases as he has described from a simple beginning. In addition to treating a simple proctitis and removal by whatever methods you may choose for the piles and a method which I find I can do more than with any other is one in which I first tie off the pile, then coagulate the pile down to a button when I know it won't break open or get infected. In addition to that I find that a lot can be done in restoring the tone of the parts by the use of a copper electrode or any electrode and the Morse wave, getting a massage of the parts. That also gives a great deal of benefit in restoring the tone of the prolapsed rectum. If you have a good blood supply it will not be very much trouble and there is no part where you can get the blood supply deranged more rapidly unless it is in the legs, than you can in the rectum.

In addition to that in the prolapsed rectum, even where surgery has been used, certain physical exercise between times are found very satisfactory and that is a drawing up of the parts, a contracting of the parts, several times a day. That simply does naturally the same thing you do with the wave current. When I give the wave current I give it until I get a piston effect. That can be done by the patient between times to a great deal of advantage.

This case was one that, for the sake of two or three Worcester men, I might say was operated on two or three times by Dr. Gage. The man was forty years old but had the mind of a boy of eight years. His mother was a Swedish woman and had been a masseuse, and anyone who knows that type of person knows that they are a very intelligent class of people. They have had a good deal of training and know how to appreciate what you do for them. This man had been operated on three times for prolapse of the rectum. He had a recurrence every time and I was asked to see what I could do, I didn't have as much apparatus at that time as I have now. So I used a simple current controller that comes in the rheostat, to get a sinusoidal by simply us-

ing the street current. I brought it up and down again to get my contractions that way. Then I said to the mother, "I do not know of any way to explain to you what I want to do but the way I am going to explain it is to have you have that boy do what he would do if he had taken a dose of physic and was unable to get to the toilet as quick as he wanted to. Tell him to contract the parts and hold it." She thought she could make him understand it. About a month or six weeks afterwards I saw a letter Dr. Gage had received from him saying that he had had complete relief and never had any more trouble from the prolapse.

DR. GEORGE J. OTT (Closing): I am very glad indeed that Dr. Brown gave us his discussion. It was very interesting indeed. I am thankful to all of you for your discussions.

The thought just came to me while Dr. Brown was talking that if his case of hemorrhoidal protusions as large as an English walnut might not have been a partial rectal prolapse. If so he has certainly done well to get at it by means of the Biermann clamp. My experience with Dr. Biermann's clamp is that it does not reach as high as I want it to in some cases. When the hemorrhoids are high up you can get up about an inch but no higher. I have had several cases of ulcer that I have had a great deal of trouble with in getting complete dilatation. No clamp would be needed but with some difficulty I got up nearly four inches. Perhaps I am not as skillful as some men but the ulcers healed and the patients got relief, even though they had been having pain constantly for ten years and had been operated on.

Dr. Snow spoke about the static current. I agree with that entirely but it is applicable only in the newer cases of hemorrhoids. It reminded me of some cases of a long time ago, some very serious cases of prolapse following hemorrhoids, a combination of pathology, with the old method adopted a number of years ago, the Whitehead operation, done under ether with cautery. There were some beautiful scars and trouble, though the patient did get well.

Dr. Stowell speaks of the causes of hemorrhoids, etc., not always easily ascertained and it is true enough, but I think we should find out a little more about our patients, as to what they are doing, whether they are drinking too much coffee and do not eat the proper food, whether an insufficient amount of water is being taken, whether they are not exercising enough, taking long breaths or whether they become so lazy that they become foul and infected throughout. That is why I suggested in my paper that the general hygiene needed to be looked after for perhaps a whole week before you undertook anything if you wanted the best results.

EDITORIAL

ARCHIVES OF PHYSICAL THERAPY, X-RAY, RADIUM

DISRAELI KOBAK, M. D., Editor
Suite 820—30 North Michigan Avenue,
Chicago, Illinois.

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ALBERT F. TYLER, M. D., Managing Editor

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**Seventh Annual Meeting
October 8-13, 1928
Stevens Hotel,
Chicago**

IRRADIATED FOODS WITH SPECIAL REFERENCE TO IRRADIATED ORANGE JUICE

The interest displayed by pediatricians and others in irradiated foods of all sorts has been manifested by more intensive and more exten-

sive research of this problem. From the time Hess of New York and Steenbock of Madison, published their preliminary reports, each working independently, until the present, numerous additional reports by investigators have appeared in current scientific journals. Less than a year ago, Maslow, Shelling and Kramer, in the Bulletin of the Johns Hopkins Hospital, described their experiments, having in mind the possibility of producing an agent which besides being antiscorbutic would also be capable of preventing or curing rickets. They irradiated orange juice "since it has been shown by Zilva that irradiation of lemon juice for as long as eight hours does not impair its antiscorbutic potency." The experiments of Maslow and his co-workers were therefore concerned with the cure of experimentally produced rickets in the rat by administering irradiated orange juice along with a standard rickets-producing diet.

The results obtained are of interest. "When rachitic animals are fed irradiated orange juice, healing may be present after five days and is almost complete at the end of fifteen days. Those fed on non-irradiated orange juice showed either no healing or only small deposits of calcium salts in places about the cartilage cells, but none in the metaphysis."

The inorganic phosphorus and serum calcium was also influenced favorably. These experiments are more or less conclusive since they were carefully controlled, because in part in analogous studies by Howland and Kramer, it was shown that in active rickets the product of the concentration of the calcium and inorganic phosphorous of the serum expressed in mg. per cent is always below 30, and as soon as healing occurs this product invariably rises above 35.

Maslow and his associates rightfully conclude then, that while the present experiments are of preliminary nature, they serve to demonstrate that: 1. Anti-rachitic properties can be imparted to orange juice by irradiation with the mercury quartz lamp. 2. After feeding of irradiated orange juice to rachitic rats healing may be demonstrated as early as five days and is almost complete at the end of fifteen days.

The problem now is to determine the value of irradiated orange juice clinically, in order to show clinical application of the animal experiments. The same workers are therefore engaged in this investigation and have experiments in progress to ascertain. 1. The antirachitic value of irradiated orange juice in the cure of rickets in children. 2. The effect of irradiation on the antiscorbutic factor of orange juice at various reactions. The length of time which irradiated orange juice retains its antirachitic properties.

D. K.

1928 CLINICAL CONGRESS OF PHYSICAL
THERAPY AND SEVENTH ANNUAL
MEETING OF THE AMERICAN
COLLEGE OF PHYSICAL
THERAPY

Plans are already under way for the 1928 clinical congress of physical therapy and seventh annual meeting of the college. While the 1926 and 1927 meetings were great events and attracted physicians in large numbers from all over the world, the 1928 meeting promises to be the biggest and best event ever held under the auspices of the college. The new Stevens Hotel in Chicago has been selected for the headquarters and technical exhibits. The unusual accommodations of this new hostelry should prove to be an added incentive to put over an unusual convention. The Stevens has probably the largest exhibit hall of any hotel in the United States. The meeting rooms are spacious and well located and should provide excellent facilities for all of the scientific sessions.

The program is now being arranged. The plan of it will be somewhat different than in former years. Fellows and others desirous of presenting papers must send in titles and abstracts not later than May 15th, as a preliminary program will be printed for distribution about the time of the A. M. A. Meeting in June.

The program committee welcomes suggestions of all kinds. It is the desire of this committee to meet the wishes of all those who attend the annual sessions. By constructive criticism and suggestions from various sources, it is frequently possible to improve the program and plan of our meetings, especially the scientific sessions.

Please address all communications to
Chairman, Convention Committee,
Suite 820-30 N. Michigan Avenue,
Chicago, Illinois.

EUROPEAN TOUR
AMERICAN COLLEGE OF
PHYSICAL THERAPY
1928

*To Attend Lectures - Clinics - and
Visit the Leading Centers of
Physical Therapy*

Mindful of the great benefits to be derived from first hand contact with European leaders in our profession, *The American College of Physical Therapy* invites you to attend a series of lectures to be held at the leading centers of physical therapy abroad. You will note the itinerary has been very carefully planned to give ample time for clinics and lectures as well as an opportunity to visit principal points of interest in the various cities. While en route on the Atlantic liner a systemized course of lectures will be given on physical therapy by two leading teachers in this special work. There will be demonstrations and personal conferences in all branches of electro-physical therapy.

The steamships used are well known Cunard cabin boats offering every comfort at minimum rates, and only hotels of repute will be used. For those desiring to attend the Radiological Congress at Stockholm in July an extension tour can be arranged at very little additional cost. Ladies are welcome, special provisions having been made for their diversion while the doctors attend the lectures and clinics.

The membership fee is \$977 from New York to New York, which includes all steamboat, railroad and motor car fares, hotel accommodations with table d'hôte meals; all sightseeing, as provided in the itinerary, and all tips to hotel staffs and baggagemen, except in England where tipping en masse is resented. A large suit case is presented to each member, which will be transported through the trip free of charge.

This is an unusual opportunity for the doctor to combine a pleasure trip with one that will give him a very intensive course in physical therapy, together with close observation of the work in this specialty that is being carried on by the pioneers of Europe. The instruction course which will be offered on the voyage en route will in itself give the doctor:

(1) An opportunity to acquaint himself with the fundamentals and practical experiences of recognized specialists. This means that it is not absolutely necessary for one previously to have had any experience with the use of physical agents.

(2) An intensive and thorough review course in every branch of electro-physical therapy as employed in all the various specialties of medicine and surgery.

The visits at the various hospitals and clinics in the prominent cities of Europe and the personal contact with the clinicians who have developed physical therapy will tend further to augment the preliminary instruction work. All in all, this combined and systematized method of offering such an intensive plan should indeed

be an attraction to every physician. *The American College of Physical Therapy* is very glad to offer this means to its fellows and other physicians who are interested in physical therapeutics.

ITINERARY

- May 26. Sail from New York.
- June 4. LONDON.
- June 5. St. Bartholomew's Hospital.
- June 6. Middlesex Hospital.
- June 7. London General Hospital.
- June 8. Lord Trelor Hospital.
- June 9. Leave 9 a. m. Arrive Paris 4 p. m.
- June 10. PARIS: Motor to Versailles.
- June 11. Sal Petre & American Hospitals.
- June 12. Prof. D'Arsonval's clinic.
- June 13. Dr. Riviere's clinic: Hotel Dieu.
- June 14. Guests of Soc. Electrotherapy and Radiology of France.
- June 15.
- June 16. Leave 8 a. m. Arrive Lausanne 5:20 p. m. Leave 8:25 p. m. Arrive Montreux 9:07 p. m.
- June 17. MONTREUX. Castle of Chillon.
- June 18. Motor to Leysin. Prof. Rolliere's clinic.
- June 19. Leave 11:05 a. m. Arrive Zurich 7:06 p. m.
- June 20. ZURICH. University of Zurich.
- June 21. Leave 8:24 a. m.
- June 22. VIENNA. Dr. Kowarchik's clinic.
- June 23. Allgemeine Krankenhaus.
- June 24. Potsdam.
- June 25. Kaiser Jubiläum Spital.
- June 26. Other clinics and hospitals.
- June 27. Leave 8 a. m. Arrive Berlin 10:27 p. m.
- June 28. BERLIN. Dr. Rudolf Verchow Krankenhaus.
- June 29. Dr. Nagelschmidt's clinic.
- June 30. Other clinics.

- July 1. Leave 8:20 a. m. Arrive
Copenhagen 7:05 p. m.
- July 2. COPENHAGEN.
Finsen Institute.
- July 3. Dr. Carl Sonne's Laboratory.
- July 4. Sail for New York.

INTERNATIONAL CONGRESS OF RADIOLOGY, STOCKHOLM, JULY
23-27, 1928.

Literary Exhibition.

As an important complement to the transactions of the Congress in what concerns instruction in Medical Radiology the Committee of the Congress has decided to arrange a literary exhibition on the Congress premises in the Riksdagshuset (House of Parliament), such an exhibition to comprise all text- and hand-books on the scopes of Roentgen Diagnostics, Radiotherapy (Roentgen, Radium- and Heliotherapy), Medical Electrology and Radio-physics and finally Instruction and Training in Medical Radiology, published during the last five years, as well as the last complete volume of all radiological journals.

The Congress Committee has much pleasure in inviting all publishers interested to participate in the literary exhibition of the Second International Congress of Radiology.

"A.-B. Nordiska Bokhandeln" in Stockholm has kindly undertaken to arrange this exhibition and will also be to the service of those members of the Congress who might wish to order books or journals.

We are convinced that all publishers concerned will support us in our endeavor to make the radiological literature known in the different countries by exhibiting all text- and hand-books published during the last five years as, well as any other original works on the above named scientific subjects in addition to the last complete volume of radiological journals.

WESTERN PHYSICAL THERAPY
MEETING PROGRAM
FRIDAY, APRIL 20

SCIENTIFIC SESSION—9 O'CLOCK

Address of Welcome—Dr. Kerwin W. Kinard, President Jackson County Medical Society.

"What's in a Name?"—Dr. Burton B. Grover, Colorado Springs, Colo.

"Physical Therapy, Positive and Negative"—Dr. J. C. Elsom, Madison, Wis.

"The Use of Static Methods in Gynecological Conditions"—Dr. Mary Arnold Snow, New York City.

"Roentgen Ray Examination of the Gastro-Intestinal Tract"—Dr. Roy W. Fouts, Omaha, Nebr.

"Physical Therapy in Diseases of the Stomach and Colon"—Dr. J. M. Bell, St. Joseph, Mo.

AFTERNOON SESSION—2 O'CLOCK

"Problems in Physical Therapy Education"—Dr. Edward N. Kime, Indianapolis, Ind.

"Actual Results Obtained in a Large Number of Private and Hospital Cases"—Dr. Edwin Lee Libberts, Indianapolis, Ind.

"Focal Reaction to Ultra Violet Radiation"—Dr. G. J. Warnshius, Milwaukee, Wis.

"The Benefits of Heliotherapy in General Practice"—Dr. C. M. Westerman, St. Louis, Mo.

"The Value of Physical Therapy in Industrial Practice"—Dr. Frank Walke, Shreveport, La.

"The Application of Physical Measures to the Head"—Dr. William A. Lurie, New Orleans, La.

FRIDAY EVENING SESSION—6:30 O'CLOCK

"Good Fellowship" Dinner (Informal—Come as you are) in the Junior Assembly (Roof).—Toastmaster, Dr. J. C. Elsom.

Address, Dr. Jabez N. Jackson, Kansas City, Mo. (President American Medical Association.)

Presidential Address, Dr. Jos. E. G. Waddington, Detroit, Mich. ("Physical Therapy, What It Is, What It Should and Shall Be.")

Address, Dr. Ralph Holbrook, Kansas City, Mo. (President-elect Jackson County Medical Society.)

Address, Dr. Richard L. Sutton, Kansas City, Mo. ("Africa and Big Game.")

SATURDAY, APRIL 21

SCIENTIFIC SESSION—9 O'CLOCK

"Observations on, and the Treatment of Infantile Paralysis"—Dr. William Benham Snow, New York City.

"Present Status of Physical Therapy in Dental Practice"—Dr. C. E. Norris, Indianapolis, Ind.

"Five-Year End Results of Treatment of Uterine Cancer with Radium and X Rays of Varying Voltage"—Dr. Henry Schmitz, Chicago, Ill.

"The Practical Uses of Physical Therapy in the Office of the Otolaryngologist and Rhinologist"—Dr. J. H. Hester, Louisville, Ky.

AFTERNOON SESSION—2 O'CLOCK

"Useful Physiotherapy Before, During and After Operation"—Dr. James T. Case, Battle Creek, Mich.

"Pulmonary Cases Treated with Ultra Violet, Report of Cases"—Dr. L. J. Kosminsky, Texarkana, Ark.

"Why Galvanism"—Dr. Frederick H. Morse, Boston, Mass.

"Management of Dysmenorrhea"—Dr. A. David Willmoth, Louisville, Ky.

"The Psychology of Physical Therapy"—Dr. Curran Pope, Louisville, Ky.

"Illnesses Caused by Physical Agents, Such as Light, Heat, Cold, Mechanical Irritation, and in the Case of Heat Sensitiveness by Physical and Mental Exertion"—Dr. William W. Duke, Kansas City, Mo.

"Spinal Nerve Radiculitis Simulating Visceral Disease Case Reports with Comments"—Dr. Geo. E. Knappenbtrger, Kansas City, Mo.

"Some Problems of the Physical Therapist,"—Dr. W. P. Grimes, Kansas City, Mo.

"The Abdomen"—Dr. L. A. Marty, Kansas City, Mo.

"Review of Advances in Physical Therapy"—Dr. Richard Kovacs, New York City.

Title Unannounced—Dr. T. Howard Plank, San Francisco.

THE STUDENT'S LIBRARY

BOOKS REVIEWED

DENTAL MATERIA MEDICA AND THERAPEUTICS, WITH SPECIAL REFERENCE TO THE RATIONAL APPLICATION OF REMEDIAL MEASURES TO DENTAL DISEASES. By *Hermann Prinz*, A.M., D.D.S., M.D., Sc.D., Professor of Materia Medica and Therapeutics, the Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania; member of the U. S. Pharmacopeia and Formulary Committee, American Dental Association. Sixth edition, enlarged and revised according to the United States Pharmacopeia, tenth decennial revision. 632 pages, illustrated. St. Louis: C. V. Mosby Co. Cloth, \$6.00.

This is the sixth edition of "Dental Materia Medica and Therapeutics" and includes the numerous changes

of the recently published Tenth Decennial Revision of the United States Pharmacopeia as far as they are of interest to the general dental practitioner. The preface also makes note of the fact that in addition, a number of important drugs which have proved their worthiness has been added, while a few which have become obsolete are discarded.

An effort has been made to point how pharmacological research and clinical observation may be advantageously combined in the employment of drugs as therapeutic agents.

The text is splendidly written and well illustrated. The section on mouth hygiene is an addendum that is unquestionably of vital interest to the profession and laity alike.

INTERNATIONAL ABSTRACTS

How to Make Use of the Best Elective Effect of Roentgen Rays in Therapeutics. Dr. Hans Holfelder, Frankfurt-am-Main, Germany.

Roentgen rays being a physical drug with toxic as well as therapeutic values as any other drug stuff, their biological reaction in the tissue is bound to their absorption. The absorption of roentgen rays is controlled only by physical respectively optical laws and is beyond the action of the metabolism of the tissues themselves. The toxic effect of the roentgen rays, if skillfully limited to the diseased organ, can be of the greatest therapeutic value to our patients, but if administered without knowledge of their toxic qualities and without consideration for the other tissues of the body, we can expect from the roentgen ray nothing but injury to our patients. The distribution of the roentgen rays in the body tissues coming from a sharply limited roentgen ray cone is greatly influenced by the so-called disturbed rays and follows certain physical laws. In order to facilitate the administration of x rays with the goal of the most elective effect, Doctor Holfelder has built his field selector with yellow colored patterns which show the distribution of the roentgen energy in different x ray cones in accordance with the true facts. The most important points to consider in order to get in each case the best elective effect of roentgen rays are, that the administration of the first and strongest part of the x ray cone to the diseased area itself is of the greatest therapeutic value and that for doing so and for safeguarding all other tissues each case has to be treated individually, according to a carefully preconsidered plan, and that to make use of the strongest compression is of greater help to the patient than the race in voltages. —INTERNATIONAL CLINICS, December, 1927.

A Clinic at St. Bartholomew's Hospital.

Sir Charles Gordon-Watson discusses the treatment of rectal carcinoma. The first patient shown was a man, 61, a clerk, who three years ago noticed that he was getting constipated. There was no blood nor pain on defecation at that time. Six months ago he noticed he was losing weight, had increasing constipation, occa-

sional diarrhoea and a slimy discharge per rectum. At examination a large, fixed ulcerating carcinoma was found, surrounding the whole circumference of the bowel, and situated at the junction of the middle and upper thirds of the rectum. A left rectus colostomy had been performed and no secondary deposits were found. Subsequently the patient had been treated with intravenous lead injections, and during the period of lead poisoning the growth became definitely softer and there was less discharge. However, the growth steadily increased in size and for this reason it was decided to insert radium needles by the barrage method into the substance of the growth after a full exposure of the rectum from behind.

The second case was a married woman of 31, who five weeks previously first noticed pain in the rectum, which was continuous and made worse by standing. She passed mucus but no blood. A sister died of breast cancer at the age of 34. A carcinoma on the anterior and left lateral wall of the rectum was found. It was circular with a diameter of two inches. The lower margin was two inches from the anal margin. It was not attached to the surrounding structures and the perivaginal wall was not involved. The specimen moved was eight inches long. The length of the apparent free margin of the growth, which was cauliflower in type, was four inches. The size of the growth was one and a half inches in diameter, and extended round half the circumference of the bowel.

The results in both cases were good. The effect of the radium was to improve both the general and local conditions. The excision case made an uninterrupted and uneventful recovery.—International Clinics, December, 1927.

Electrothermic Methods, Roentgen Rays and Radium in the Treatment of Malignant Diseases of the Eye, Ear, Nose and Throat. J. Thompson Stevens, M. D. J. of the M. S. of N. J., Vol. XXV, No. 2, Feb., 1928.

The author discusses electrothermic methods, expressing the thought that there are some very good reasons why all the terminology must eventually give way to "Electrothermic Coagulation." This term is

also defined. Oudin or monopolar technic is described and indications and limitations given.

The scope of irradiation therapy is cited in detail. roentgen rays are indicated for irradiation of large regions, such as lymphatic drainage fields about malignant processes. Also they are the agent of choice when areas containing healthy tissues or organs must be traversed by the rays before reaching the parts to be treated. Generally, however, the roentgen rays and radium can be combined to produce maximum effect. Several illustrations amplify the description and show the results obtained by the author with this form of therapy.

Ear malignancies, malignancies of the eyeball, retrobulbar sarcomas, malignancies of the mouth and antrum, and carcinoma of the larynx are discussed at some length.

The conclusion of the author is: Electrothermic methods and irradiation therapy are of value to men interested in the treatment of malignant disease of the eye, ear, nose and throat.

Electro-Sterilization of the Tonsils. W. L. Cahall, M. D. Texas S. J. of M.

Cahall contends that many tonsils are needlessly sacrificed by surgical removal. He reviews the histologic structure of the tonsil and then quotes several views regarding the function of these structures.

"Electrocoagulation may have some salient features to commend it, but experience has taught the writer that it is not a procedure to be employed in every case."

There has been a widespread attempt to substitute x ray treatment for surgical removal of tonsils, but the results have fallen short of expectations.

Electrodesiccation likewise has given untoward results and therefore is suitable only in a limited number of cases.

Cahall employs indirect diathermia directly to the tonsil, and for lack of a better name has called it electro-sterilization. The technic is described in detail. It is not the intention to fulgurate or sear the tonsil, but to establish within the tonsillar structure as high a degree of internal heat as the patient will tolerate. Thus the micro-organisms that may be present are killed. The tonsil is sterilized, fibrosis is eliminated, swelling and inflammation subside and the patient experiences a grateful improvement in the feeling of the throat, following the first treatment. It requires 12 to 15 treatments to effect a cure. Daily treatments are given. Not only is there no edema

produced, but there is actual shrinkage of the tonsil; at the conclusion of the treatment these organs are reduced to normal size, and, the tendency to recurrent attacks of tonsillitis is terminated. Fifty patients have been thus treated with uniform results.

Electrotherapy in the Treatment of Vomiting of Pregnancy. T. H. Jones, M. D. The J. of the Arkansas M. S., Feb., 1928.

Jones suggests galvanism for vomiting of pregnancy and recommends the following technic: We wet a large pad that will cover most of the abdomen and attach it to the negative pole of the galvanic machine. Then two small sponge discs about the size of a dollar are attached to the double end of a bifurcated cord, each of which is placed over the pneumogastric nerve in a sub-aural position. The single end of the cord is attached to the positive pole. The current is slowly turned on to from 15 to 20 milliamperes. Some patients are able to stand more than others. This is maintained for ten to fifteen minutes. In obstinate cases the treatment is given twice a day.

Several case reports are given. Jones does not contend that galvanism will help every case. He cites his own failures. He believes, however, that selected cases show benefit from galvanic treatment with the technic described.

On the Treatment of Skin Diseases with Bucky's End Rays. H. Fuhs. Strahlenther. 1927, 26, 4.

The author uses a water cooled Muller tube for soft ray therapy with iron chromatan cathode, a special apparatus (Sommer, Vienna). Time dosage is under equal operative relations with biologically dosaged tubes. During an observation time of one-half year no late injuries occurred. The observations made by Bucky can only be partly confirmed. This includes the relative harmlessness and toleration of the skin for the Bucky rays. The absence of any epilatory effect is confirmed. Convincing results of treatment could only be confirmed in certain forms of skin tuberculosis. The diseases treated successfully included tuberculosis verrucosa cutis, erythema induratum Bazin, hidrosadenitis axillaris, lichen chronicus Vidal, mycosis fungoides, benign skin tumors. The border ray therapy is not convincing in the so-called indications of Bucky and his co-workers. The experiments on the significance of the

Bucky rays are not yet definitely at an end. Apparently the border rays are not the specific therapeutic method for the dermatoses, but represent one among many possible methods. They may be used alone or combined with other methods.

Vaginal Heliotherapy of Landeker-Steinberg.
Leo Stiebeck. M. Kl. 1927, 42. P. 1611.

The author reports treatment of 36 polyclinic patients with the ultra sun. The direction of the rays of the arc is toward the portio, behind the vaginal vault. As a result of the irradiation, general and local reactions appeared. Regressive changes in the deeper organs undergoing inflammatory changes were definitely determinable. There were 35.5 per cent failures. Conservative gynecological measures should be applied together with the effective Landeker irradiations. Further augmentation of the effect and reduction in the treatment time are to be expected with other irradiation methods, as well as with simultaneous heat radiations. High frequency current and electrical heat radiation may be utilized.

Radiographic Modifications of the Skeleton of Rachitic Infants Submitted to the Action of Ultra Violet Rays. G. Battisto Salvatori. L'Actinoterapia, Vol. VI, fasc. 2, May, 1927. Abstract, Journal de Radiologie et de Electrolgie. Vol. XI, No. 11, Nov., 1927.

The author treated in the orthopedic sanatorium institute of Arricia, numerous cases of rickets and he was able to obtain remarkable improvements, particularly in skeletal lesions. The patients were clinically cured and only the radiographic examination indicated the persistence of lighter rachitic lesions of the bones. These lesions persisted even after repeated series of actinotherapeutic sessions.

The results were favorable in 100 per cent of the cases with variations as to the degree of improvement. The author concludes by mentioning the principal theories of the action of the ultraviolet rays in the English disease. (Photo-synthesis of vitamin D.)

Further Observations on the Treatment of Tuberculosis of the Mucous Membrane with Artificial Sunlight. Wessly. Wiener Med. Wschr. 77 Heft 34, Aug. 20, 1927.

Irradiations with artificial sunlight on 554 patients with tuberculosis of the mucous membrane, yielded the

following results: The greatest success was obtained in patients with a good power of resistance and a relatively good power of regeneration. To this group belong cases with lung processes which showed progress or had become stationary. In febrile patients who were in good general condition, a destruction of the mucous membrane processes was obtained through the irradiations. At the same time there often occurred a fall in the temperature by lysis. There was also to be observed an objectively demonstrable improvement in the general condition and of the lung process. In the majority of the febrile cases there was no local cure. The process, however, remained stationary and the pains disappeared in desperate cases. The light could not effect a reparation nor an analgesic influence in severe tuberculous processes.

No success was obtained in tuberculous mucous membranes with miliary dissemination, although in the beginning there seemed to be some favorable influence. The prospects for cicatrization are also dependent on the localization of the process.

Filtration in Roentgen Therapy: A Study in Physics. P. Lamarque. Arch de Electricite Medicale, No. 525, March-April, 1927.

The author reviews the theoretical problem of filtration and shows how one can calculate the equivalent thickness of two filters from one given lambda and trace the approximate spectral curves before and after filtration. One can thus see that the filters of the heavy metals are better adapted for obtaining homogeneous bundles of short waves. For the median values of lambda, according to the author, the filtration by aluminum is best.

The Active dose in the Treatment of Erysipelas by the Quartz Lamp. J. Becker. Munhr-ener Med. Wschr., Vol. LXXIV, No. 12, March 25, 1927.

The diverse results obtained in the treatment of erysipelas by ultraviolet depend above all on the difference in dosage. Upon administering one and one-half times the erythematous dose upon a field of about four cm. one most often gets immediate excellent results. The erythema disappears, the fever drops, pain ceases, the general condition improves; all this occurs in 24 hours. There are serious cases, however, which fail to respond to this treatment.

Physical Researches on the Border Rays of Bucky. H. Kirschirs. Munchener Med. Wschr., Vol. LXXIV, No. 14, April 8, 1927.

The ultra rays of 1.7 to 2 A. units of wave length, produced by a tube furnished with a Lindemann window, cause a cutaneous erythema after exposure of three minutes at a distance of five cm. from the window. The erythema reaches its maximum in three or four days. The succeeding pigmentation lasts several months. Measurements with the ionometer of Martius show that if the voltage at the posts of the tube remain constant (nine kilowatts), the variations in intensity can only slightly affect the dosage. On the contrary, however, at a constant intensity the ionization is much too rapid when the voltage increases; the rays become harder.

Ultraviolet Rays in the Treatment of Late Post Serum Affections. Fraiken and Burill. Bulletin Official de la Societe Francaise d'Electrotherapie et de Radiologie. May, 1927.

1. Girl, 8 years old: a month after diphtheria treated by serum. Fever, emaciation, anemia, joint pains. After six weeks of this condition application of mercury vapor lamp; relief on the third day with decrease of fever. At the eighth session an increase in weight of 500 grams. Cure in 12 sessions.

2. Child, 11 years. Two and one-half months after diphtheria, which required 150 cc. of serum. One and one-half months after beginning ultraviolet treatment decrease in fever after second session. Cure in 25 sessions.

The Present State of Curie Therapy of Carcinoma. Otto Schurch. Schweiz. Med. Wschr., No. 32, 1927.

The question of carcinoma treatment has ceased to be a purely surgical one. Three chief possibilities are to be differentiated in the application of radio-active substances Curie therapy as applied ordinarily or the natural method, the interstitial or intratumor Curie therapy, and external Curietherapy. The natural method consists in the insertion of radio carriers in the nose, esophagus, bladder, vagina, rectum, etc. It has a certain value only in the treatment of cervix carcinoma and certain tumors of the upper air passages. Intratumoral Curietherapy, also, has only a limited importance. Surface irradiations permit of a still further development of curietherapy. Here an attempt is made

to increase the deep effect by removing the radiating substance at a distance from the skin, thus making use of the effect of the diffusion of the irradiation in the tissues and increasing its penetrability. In addition, many bundles of rays are directed at the tumor through many portals of entry from many sources. Metastases in the glands are not affected by Curietherapy. Successful results are also to be mentioned in the treatment of skin carcinoma. Roentgen as well as Curietherapy give in all cases 90 per cent permanent cure. Nevous carcinomas are to be excluded, however. Here the best results are obtained with electrolysis and diathermo-coagulation. Carcinomata of the uterus are influenced very favorably. In cases on the border line of operability, curietherapy is to be preferred to surgery. Of 257 tongue carcinomas, 133 were cured locally. Of these, 56 died later of metastases, 77 were permanently cured. Every operable mamma carcinoma must be operated. Curietherapy may result in cure of inoperable carcinoma. The technique of Curietherapy is still in a state of transition. Whether the application of larger radiating masses or the development of the distance irradiation, will bring greater and better results remains for the future to determine.

On the Transmissibility of Animal and Human Skin in the Visible Part of the Spectrum; W. E. Pauli and H. Kliewe. Strahlenther, 1927, 26, 4.

Sensitized skin with increased transmissibility for the short rays of the spectrum after a minimum irradiation of ten minutes, an inhibition of growth of staphylococci and streptococci. Normal skin, even after twenty minutes irradiation did not cause any inhibition. Experiments must be performed on living skin in order to determine to what extent the radiation doses which inhibit culture growth are injurious to the skin. More experiments are necessary to determine whether such methods can influence favorably artificially produced parasites or phlegmonous processes.

The Antirachitic Effect of Milk Irradiated in a Carbon Dioxide Atmosphere. K. Scheer and P. P. Rosenthal. Zschr. f. Kindhlk. 1927, 44, 3-4.

Foods must be irradiated in the absence of oxygen in order to avoid the unpleasant odor and taste effects of the ineffectual oxidation products. This is accomplished for milk by means of an apparatus of Dr. Scholl

in which the milk is kept in a closed system under carbon dioxide pressure during the irradiation. Milk irradiated in this manner has the full antirachitic properties and cures florid rickets within four to six weeks with a daily amount of 300 to 500 cc.

The Measurement of Therapeutic Light Rays.
H. Malten. Strahlenther. 1927, 27, 1.

The measurements were electroscopic and were made with "Efka-Uvaumeter," Kohl, Leipzig. The various effective groups are measured, but the heat rays are not included. No artificial source of light can substitute for natural sunlight, since none reach its high intensity in the visible and long waved ultra violet rays.

On the Dosimetry and Dosage of the Integral Radiations in Heliotherapy of Pulmonary Tuberculosis. Mesernitzki. Zschr. f. d. ges. Phys. Ther. 1927, 34, 2.

Mistakes up to 300 per cent arise in the incorrect dose measurements of the sun baths according to minutes. Therefore, a dosimetry was worked out which consists of a means of determining the number of calories which are absorbed by one square cm. of body surface in one minute. The variations of sun energy in the different months and times of day are indicated on corresponding tables. In lung tuberculosis, one begins with 5 or 2.5 calories on each square cm. of body surface and increases gradually to 30 cm. per square cm. In extra pulmonary tuberculosis up to 100 calories were administered.